Journal of the Society of Arts.

FRIDAY, MAY 22, 1868.

Announcements by the Council.

ORDINARY MEETINGS.

Wednesday evenings, at Eight o'Clock :—

MAY 27.—*Derby-day.*—NO MEETING.

CONVERSAZIONE.

The Council have arranged for a conversazione, at the South Kensington Museum, on Wednesday, the 3rd June, cards for which are now being issued.

MR. WHITWORTH'S SCHOLARSHIPS — PREPARATORY EXHIBITIONS.

The Council have received the following communication from the Committee of Council on Education :—

Kensington Museum,
May 8, 1868.

To the Secretary of the Society of Arts.

SIR,—I am directed by the Lords of the Committee of Council on Education to transmit a copy of a minute, dated 5th May, 1868, which their Lordships have passed on a communication made to them by Mr. Whitworth, expressing his intention of preparing for carrying into effect his liberal endowment for thirty scholarships of £100 each, to create at once sixty exhibitions of the value of £25, to be held for the ensuing year. It is Mr. Whitworth's desire that three of these exhibitions should be placed at the free and absolute disposal of the Council of the Society of Arts.

The exhibitions may be given with or without competition, as the Council see fit, to an artisan who has obtained certificates of competency at the examinations conducted by the Society of Arts, or by the Science and Art Department. The only condition attached to the acceptance of these exhibitions is, that the holder proceeds to qualify himself for the competition for the scholarships of £100 to be conducted in May, 1869, and satisfies the Council that he will present himself as a candidate at that competition. The use of one or more of the tools specified, namely, the axe, saw, and plane, hammer, chisel, and forge may be acquired at almost every village in the United Kingdom.

I also inclose specimens of the Examination papers, showing the nature of the Examination which will be held for the competition for the scholarships of £100 by the Science and Art Department in 1869. In the event of the Council's accepting the exhibitions of £25, further information respecting the £100 scholarships in 1869 will be sent.

The Lords of the Committee of Council on Education desire to express their earnest hope that the Council of the Society of Arts may be able to give its hearty co-operation to Mr. Whitworth's patriotic endeavour to benefit the mechanical and engineering industry of this country.—I have the honour to be, Sir,

Your obedient servant,

HENRY COLE.

[ENCLOSURE.]

MR. WHITWORTH'S SCHOLARSHIPS FOR MECHANICAL SCIENCE.

At Whitehall, the 5th day of May, 1868.

By the Right Honourable the Lords of the Committee of her Majesty's most Honourable Privy Council on Education.

My Lords read Mr. Whitworth's letter of 4th May, 1868, transmitting a memorandum on his scholarships, and on the establishment of sixty exhibitions of £25 for the present year preparatory to the competition for his scholarships, and requesting that the Science and Art Department may conduct the necessary examinations and correspondence.

Their Lordships have great pleasure in acceding to Mr. Whitworth's request, and giving every assistance in their power in carrying out his patriotic munificence.

Manchester, 4th May, 1868.

Sir,—Referring to your letter of March 28th, by which you transmit to me a copy of the minute which the Lords of the Committee of Council on Education had passed in acknowledgment of my endowment of scholarships for promoting mechanical science, and to the concluding sentence of the minute, which invites further suggestions and offers to render assistance in carrying out the intentions of the endowment :

1. I beg leave to enclose, for the information of the Lords of the Committee of Council on Education, a memorandum on the subject of the endowment, which I trust will meet with the approval of their Lordships, and that they will cause it to be circulated, and the necessary correspondence arising out of it to be conducted by the Science and Art Department.

2. I would beg leave to ask the Lords of the Committee of Council on Education to undertake the examinations for these scholarships.

3. As respects the preparation of the necessary details for the examinations in the use of tools, I am willing to be responsible myself with the aid of friends, and I propose to obtain the consent of a few gentlemen to advise with me from time to time in whatever may arise in the future for my consideration.

4. In reply to the invitation of their lordships to submit any suggestions, I venture to submit for consideration whether honours, in the nature of degrees, might not be conferred by some competent authority on successful students each year, thus creating a faculty of industry analogous to the existing faculties of Divinity, Law, and Medicine. I am of opinion that such honours would be a great incentive to exertion and would tend greatly to promote the object in view.

5. I venture further to express a hope that the Government will provide the necessary funds for endowing a sufficient number of Professors of Mechanics throughout the United Kingdom.

6. In conclusion I inform you that the necessary arrangements for securing the endowment have been made, and I have given instructions for the preparation of the draft of a deed of trust which will be sent for the approval of the Lord President.

I am, Sir, your obedient servant,

JOSEPH WHITWORTH.

To Henry Cole, Esq.,
Secretary of the Science and Art Department.

MEMORANDUM ON SCHOLARSHIPS FOR MECHANICAL SCIENCE.

To be competed for in May, 1869.

I. Having offered to the Lords of the Committee of Council on Education to "found thirty scholarships of the annual value of one hundred pounds each, to be applied for the further instruction of young men, natives of the United Kingdom, selected by open competition for their intelligence and proficiency in the theory and

practice of Mechanics and its cognate sciences, with a view to the promotion of Engineering and Mechanical Industry in this country," I propose that the following should be the general arrangements in the first instance, which may be modified after the first competition has taken place in May, 1869.

II. That the thirty scholarships of £100 each should be open to all of her Majesty's subjects, whether of the United Kingdom, India, or the Colonies, who do not exceed the age of twenty-six years, and be held either for two or three years, as experience may prove to be desirable; that ten scholarships should be competed for and awarded in May, 1869, at the annual National Examinations in Science, provided that a sufficient number of candidates prove themselves to be competent; that the successful candidates should be required to spend the period of holding the scholarships in the further satisfactory prosecution of the studies and practice of Mechanical Engineering, and pursue their studies according to the spirit of the endowment, making periodical reports of them; that the student should state where he proposes to pursue his studies, the Lord President of the Council deciding if the proposal can be allowed, also if the student's progress be satisfactory, and the manner in which it shall be tested from year to year. In deciding if the plan of study proposed by the student be satisfactory as much latitude as possible may be allowed. If the student wish to complete his general education, instead of continuing his special scientific study, he may be permitted to do so. He may go to the universities or colleges affording scientific or technical instruction, or he may travel abroad. The successful artisan should be encouraged to study theory, and the successful competitor in theory aided in getting admission to machine shops and other practical establishments. All further details would be hereafter prepared and issued by the Science and Art Department.

III. The candidates must be of sound bodily constitution.

IV. The first competition should be in the following theoretical subjects:—

1. Mathematics (elementary and higher).
2. Mechanics (theoretical and applied).
3. Practical plane and descriptive geometry, and mechanical and freehand drawing.
4. Physics.
5. Chemistry, including metallurgy.

And in the following handicrafts:—

1. Smiths' work
2. Turning.
3. Filing and fitting.
4. Pattern making and moulding.

V. No candidate should obtain a scholarship who has not shown a satisfactory knowledge of all the following theoretical subjects:—

1. Elementary mathematics.
2. Elementary mechanics.
3. Practical plane and descriptive geometry, and freehand drawing,

with the power to use one or more of the following classes of tools:—

a. The axe.
b. The saw and plane.
c. The hammer and chisel.
d. The file.
e. The forge.

I propose that the maximum number of marks obtainable in the theoretical subjects and those obtainable by the most skilled workman should be about equal.

IV. My object in devising the foregoing scheme has been, while requiring a practical acquaintance with a few simple tools as a *sine qua non*, to render the competition accessible on fairly equal terms to the student who combines some practice with his theory, and to the artisan who combines some theoretical knowledge with perfection of workmanship.

PREPARATORY EXHIBITIONS OF £25 FOR THE YEAR 1868.

VII. As the scholarships scheme can only come into full operation by degrees, I propose from the fund ultimately available for the scheme at once to create sixty exhibitions or premiums, of the value of £25 each, tenable until April, 1869, and to place them at the absolute disposal of the governing bodies of the following educational institutions and towns, in order that they may award them to youths under twenty-two years of age, who may thus be aided to qualify themselves, and must undertake to compete for the scholarships of £100 in May, 1869.

VIII. Eight exhibitions to Owens College, and two to the Grammar School, Manchester, the seat of my workshops; three to the University of Oxford; three to the University of Cambridge; three to the University of London; and one to each of the following universities, colleges, and public schools:—

University of Durham.
University of Dublin.
University of Edinburgh.
Watt Institution, Edinburgh.
University of Glasgow.
Andersonian University, Glasgow.
University of St. Andrew's.
University of Aberdeen.
To each of the Queen's Colleges at Belfast, Cork, Galway, Ireland.
King's College, London.
University College, London.
Eton.
Harrow.
Rugby.
Charterhouse.
Westminster.
Winchester.
St. Paul's, London.
Merchants Tailors.
Christ's Hospital.
City of London.
Shrewsbury.
Marlborough.
Cheltenham.
Chester.
Clifton.
Brighton.
Liverpool.

Two to the College of Preceptors, and three to the Science and Art Department. I propose that the following exhibitions shall be given to artisans only:—

Three to the Society of Arts.

Also one for artisans to each of the following towns:—

Birmingham.
Bristol.
Swansea and Cardiff.
Halifax or Huddersfield.
Leeds.
Northampton.
Sheffield.

and if there be any of the above unapplied, they may be given by the Science and Art Department to any other scholastic institution which makes satisfactory arrangements for affording instruction in Mathematics and Mechanics, Freehand and Mechanical Drawing.

IX. I would point out that the exhibitions to artisans may perhaps be increased to £50 for the year, by connecting them with the Science and Art Department, under the minute of the 21st December 1867.

(Signed) JOSEPH WHITWORTH

Manchester, 4th May, 1868.

MINUTE ON MR. WHITWORTH'S OFFER TO ENDOW SCHOLARSHIPS.

At Whitehall the 27th day of March, 1868.—By the Right Honourable the Lords of the Committee of Her Majesty's most honourable Privy Council on Education.

My Lords consider Mr. Whitworth's letter to the First Lord of the Treasury, dated 18th March, 1868. In this letter Mr. Whitworth offers to found thirty scholarships of the annual value of one hundred pounds each, to be further applied for the instruction of young men, natives of the United Kingdom, selected by open competition for their intelligence and proficiency in the theory and practice of Mechanics and its cognate sciences, with a view to the promotion of Engineering and Mechanical Industry in this country; and he expresses hopes that means may be found for bringing Science and Industry into closer relation with each other than at present obtains here.

It is unnecessary now to repeat the thanks which the First Lord of Her Majesty's Treasury and the Lord President of the Council have already conveyed to Mr. Whitworth for his generous offer, which they are convinced the country will fully appreciate.

Mr. Whitworth proposes that these scholarships should be tenable on conditions to be defined by a deed of trust regulating the administration of the endowment fund during his life, and that thereafter the management of this fund, subject to the conditions specified therein, should rest in the Lord President of the Council or other Minister of Public Instruction for the time being.

It is the wish of my Lords to see provision made in several large centres of manufacturing industry in the United Kingdom for affording to all classes of Her Majesty's subjects ample opportunities for acquiring instruction in the sciences which are applicable to productive industry. My Lords are of opinion that by the union of local and private efforts supplemented as far as is proper by State assistance this provision will be best made.

This will be rendered easy if the munificent example set by Mr. Whitworth shall be extensively followed by others.

My Lords will be happy to receive any further suggestions from Mr. Whitworth should he desire to make them, and to be informed if the Department can render him any assistance in carrying out his liberal intentions.

The following is the reply of the Council of the Society of Arts to the Committee of Council on Education :—

Society for the Encouragement of Arts, Manufactures, and Commerce, Adelphi, London, W.C., May 15th, 1868.

SIR,—I am directed by the Council of the Society of Arts, to acknowledge the receipt of your letter of the 8th instant, covering copy of a minute, dated 8th of May, 1868, which the Lords of the Committee of Council on Education have passed on a communication made to them by Mr. Whitworth, expressing his intention of preparing for carrying into effect his munificent endowment for thirty scholarships of £100 each, to create at once sixty exhibitions of the value of £25 each, to be held for the ensuing year, and intimating that it is Mr. Whitworth's desire that three of these scholarships should be placed at the disposal of the Council of the Society of Arts to be given to artisans on the conditions specified in Mr. Whitworth's communication. I am directed to signify the acceptance by the Council of Mr. Whitworth's liberal offer, and to say that they are anxious by every means in their power to aid in the furtherance of Mr. Whitworth's very munificent, and at the same time, carefully considered and wisely directed efforts to benefit the manufacturing industry of the country.

I have the honour to be, Sir,
Your obedient Servant,
P. LE NEVE FOSTER,
Secretary.

To Henry Cole, Esq., C.B.,
Secretary Science and Art Department.

The following letter, covering a minute passed by the Council of the Society, has been addressed to Mr. Whitworth :—

Society for the Encouragement of Arts, Manufactures, and Commerce, Adelphi, London, W.C., May 15th, 1868.

SIR,—The Council have received from the Lords of the Committee of Council on Education a minute which their Lordships have passed on a communication from you, expressing your intention of preparing to carry into effect your munificent endowment of 30 scholarships of £100 each, by creating at once sixty exhibitions of £25 each, to be held for the ensuing year, and their Lordships have informed the Council that it is your desire that three of these exhibitions should be placed at their absolute disposal, to be given to Artisans according to certain conditions specified by you.

I am directed by the Council to forward to you the accompanying resolution unanimously passed at a meeting held on Monday the 11th instant.

I have the honour, &c.,
P. LE NEVE FOSTER, Secretary.

Joseph Whitworth, Esq.

Extract from the Minutes of the Council of the Society for the Encouragement of Arts, Manufactures, and Commerce, held 11th May, 1868.

Resolved :—"That the Council express to Mr. Whitworth their high sense of his disinterested and munificent endowment of scholarships, by which the progress of scientific education among all classes of the community will be materially promoted, and offer him their best thanks for having placed at their disposal three exhibitions of £25 each, to be held for the ensuing year.

"W. HAWES (Chairman)
"P. LE NEVE FOSTER (Secretary)."

SUBSCRIPTIONS.

The Lady-day subscriptions are due, and should be forwarded by cheque or Post-office order, crossed "Coutts and Co.," and made payable to Mr. Samuel Thomas Davenport, Financial Officer.

Proceedings of the Society.

FOOD COMMITTEE.

The Committee met on Wednesday, April 29. Present—G. F. Wilson, Esq., F.R.S. (in the chair), Rev. J. E. Hall, and Mr. E. Hollond.

JAMES DEWAR, Esq., M.D., attended to give information as to a process of preserving provisions by means of sulphurous acid.

Dr. DEWAR.—My process consists in subjecting the substance to be preserved for a longer or shorter period, according to its size, to the action of sulphurous acid. This piece of meat (holding up a specimen) was immersed for about six hours in the mixture—the time requisite being about half an hour for each pound of meat. On being taken out of the liquid the meat or other article is, with as little delay as possible, subjected to a high temperature, so as to dry it to the condition in which you see these specimens. The temperature should not exceed 140°, so that the albumen may be preserved simply in a desiccated, not in a coagulated state. It is then resoluble by simple mixture with water, which is a very important matter in the making of soups. It is redissolved in about six hours, and may then be converted into excellent soup. It is better, however, to let it soak for a longer time in cold water, and then to boil it in the liquor. This sole was simply immersed for an hour and a half in the acid, and then hung up to dry in a high temperature. Here is a haddock, of which fish thousands of tons are used in a dried and salt state in Scotland; it is sweet, and although dry, is wholesome food. One or two of these specimens have had a slight sprinkling of salt, which of course would give them a faint taste of salt. These fish should be soaked about six hours before cooking.

Mr. HOLLOND.—There seems a little salt taste in this fish which you say has had no salt applied to it.

Dr. DEWAR.—That must arise from the salt in the juices of the fish. There is the same taste with the preserved lobster, which has had no salt applied to it. That

salt taste is not occasioned in any way by the sulphurous acid. I think it shows, the meat being in a somewhat concentrated form, that the animal has salt in its composition. The lobster is seven times concentrated.

The CHAIRMAN.—How long have you been making experiments in this direction?

Dr. DEWAR.—For about two years. I first tried fumigation, but I now adopt immersion as preferable. The sulphurous acid is that of the British pharmacopœia. My experience has shown me that failures are very rare if the drying process is carefully attended to after immersion; but the high temperature must be maintained; if it falls to 60° matters will go wrong. I may enumerate some of the specimens which I have brought here. Here is a halibut which was immersed for an hour and a half, and then dried in the ordinary way; other specimens of fish are prepared in the same way. This shin of beef was immersed for six hours, and it has since hung in a high temperature for two months. I do not know that it is necessary to keep it for such a length of time in a high temperature; probably a fortnight would be sufficient, but unless the meat is well dried the process might fail. This piece has been exposed to a high temperature for one month; previously it had been in an ordinary temperature for five months, but bottled and tightly corked.

The CHAIRMAN—How long do you consider it necessary to expose the meat to a high temperature before packing it?

Dr. DEWAR—With a good current of air I think three days might do. This tongue, which has been cooked, hung in the same place for ten weeks. Here is a piece of rabbit which has been hanging at a temperature of 55° for six months. In a very dry climate the temperature is not so important. Here is a bullock's heart which was immersed in the acid for six hours, and has since been hanging in the same temperature for eight weeks. A little salt was put to it at first. Here, again, is some beef powder. The meat was killed in November last; it was dried to the condition of these other specimens, and then ground into meal. All the fat was removed from the outside, but of course there is a certain quantity of fat in the grain of the meat which cannot be removed. Here are some biscuits which are made from the ground meat; twelve of them are equal to half a pound of beefsteak.

Mr. HOLLOND—What would be the retail cost of these biscuits?

Dr. DEWAR—I have not calculated that, but it can be arrived at in this way; the meat from which they are made loses four-fifths of its weight in the process, and therefore that must be allowed for. On the other hand, the lessening of the weight would, in the case of meat imported from abroad, be an advantage in the matter of freight. The biscuits are made of equal bulks of wheat meal, potato meal, and beef meal, all dried. Some of the constituents of the potato are considered important as being antiscorbutic, and the potato meal is therefore introduced. There has been no salt introduced, unless it was done by the baker. The meat loses nearly four-fifths of its weight of water, the potato rather more than four-fifths, and the wheat meal about one-tenth, so that at present prices in this country, the materials would cost about 5s. 4d. per lb.; but one pound would be equal to about five pounds of beefsteak. An eminent professor in the University of Edinburgh says that twelve of these small biscuits contain as much flesh in substance as half a pound of beef. Some of these preserved specimens have been tried, to a small extent, on board ship, and have been sent to India and Australia, with perfect success. Duplicates were likewise sent to the Abyssinian expedition.

Mr. HOLLOND—There seems a slight smell of tallow in the fat on this piece of beef.

Dr. DEWAR—In the process of drying, the fat loses its oleine and retains the stearine, which is the probable cause of that smell, like that of partially cooked fat.

The CHAIRMAN—Will you shortly state the advantage possessed by your process over the ordinary one of salting?

Dr. DEWAR—The first advantage is that the juices of the meat are retained by this process, whereas salting makes the fibres contract and thereby expel a great portion of the most valuable part of the meat. Again, salt, when taken into the constitution in excess is injurious, whereas in this process there is no taste remaining of the agent by which the preservation is effected; and if in some instances it did remain, it is not only harmless but wholesome. As to the time it will keep, if well dried and kept dry I think it will keep interminably. I have a piece of beef 21 months old lying on my mantel-piece, which has not changed at all.

Mr. HOLLOND—Can you tell us what is the proportionate difference in strength between Liebig's essence of beef and your ground beef?

Dr. DEWAR—As I understand, Liebig's essence contains little else than gelatine; the albumen is all coagulated and lost, which is a fatal defect. I have not compared the cost of this process with that of salting, but twelve of these haddocks could be preserved for a penny, as regards the sulphurous acid; then the cost of drying would depend upon the size of the premises. Twelve beef-steaks could be preserved for 1½d. or 2d., because the same liquor could be used repeatedly, with the addition of a little acid, if necessary, to keep up the strength. Here are some pieces of preserved blood—bullock's and sheep's—which is very valuable for feeding horses, cattle, pigs, poultry, &c. All of them eat it readily.*

Mr. JENKINS—Do you intend this process to take the place of salting for common domestic purposes?

Dr. DEWAR—Many of my friends use it regularly. There may be a little difficulty in exposing the meat to the high temperature required for complete preservation, but I have reason to believe that beef or mutton will keep three or four times as long by this method as it would otherwise, and that without further trouble than the mere immersion.

Mr. JENKINS—First of all, do you consider the obtaining and preparation of the acid quite within the reach of a housewife, who would use it similarly to common salt?

Dr. DEWAR—Yes; there would be more difficulty in the drying process, because that requires a heated room, the maximum temperature being 140°, and the minimum 80°. On a small scale I think the operation could be conducted before the kitchen fire. In no other way could it be accomplished by persons living in flats. I have succeeded in drying specimens before a fire, the fire being well kept up. 140° would be a safe limit, as albumen coagulates at 157°. Most unquestionably I consider there is more nutritive matter left in the meat than in the ordinary process of salting. It should be soaked 24 hours before cooking, and it then becomes fit for use. If it is to be made into soup it does not require quite so long. Here is a cake composed of preserved blood and meal; some of these were sent to Abyssinia, as being suitable provender both for man and horse. This dried fish, when made into meal, forms an excellent material for soup, and its piquant flavour makes a little go a long way. It is fit for cooking after

* In connection with the blood meal as food for horses, cattle, pigs, dogs, &c., perhaps I may be permitted to state that more matured experience fully warrants the anticipations which were early formed in regard to its efficiency as the representative of nutritive substances. Horses take it readily, mixed in a dry state, with their ordinary feed, or baked into cakes with oatmeal; and cattle eat it without hesitation, if the preservative process has been duly attended to. I have at present two oxen, which are being fed upon this novel system, and they are thriving very much to the satisfaction of my farmer friends, who inspect them periodically. Their steady and even rapid improvement is quite unusual, and the cost of their "keep" is less than one-half of the ordinary rate—the secret being that they each eat blood equivalent to 4 lbs. of beefsteak daily, their food otherwise being restricted to oat-straw, draff (malt waste), dreg (malt-steep), with the exception of 1d. worth of Indian corn meal.

twelve hours' soaking, but it is not then so soft as a fish just caught.

Mr. JENKINS—Does it retain that peculiar sapid flavour which is characteristic of many kinds of salt fish?

Dr. DEWAR—Many of my friends who have tried it prefer it greatly to salt fish; they say there is a peculiarity about it which is found in nothing else. Here is a bottle containing some small pieces of preserved salmon, which have been pronounced very good; but it does not pretend to compete with salmon freshly caught, but only as a substitute for it. I have kept herrings fresh in this way for a considerable time, and those who have tried them prefer them to anything of the kind; they are exceedingly delicate in flavour. This process has not yet been tried on a commercial scale, but I believe it very shortly will be. I believe this preserved beef would keep good for any length of time in a dry place. Dryness is more important than heat; if it were allowed to get moist it would decay.

Mr. FOSTER—I believe it is your intention to bring meat from Australia in this state?

Mr. DEWAR—Yes. My principal difficulty has been that the pieces of meat get slightly mouldy on the outside. The plan I propose is to pack them in a cask, with the interstices filled up with some anhydrous substance, such as potatoe meal; or this blood meal, which, being nearly as valuable as the beef itself, would pay its own expense of carriage. If the cask were perfectly tight I should not care in what part of the ship it was stowed.

Mr. FOSTER—Your object is to keep the albumen in such a state that it may be readily soluble when placed in water for cooking?

Dr. DEWAR—Yes; that is a point, however, as to the real value of which one may be easily deceived, because, although the albumen may have been re-dissolved, it would necessarily be coagulated during the process of cooking, and thus be practically lost, unless some means were used to suspend it, such as thickening the water with rice or other vegetable substance. In certain states of the digestion, it is important that coagulation should not have taken place, and, consequently, soup can be made of this meat or blood meal suited to invalids, by whom ordinary cooked meat could not be digested.

Mr. JENKINS—You propose to send this meat packed in casks, but with some dry material between the pieces? I can quite understand that the material with which it is packed may make all the difference in the success of the enterprise in a commercial sense.

Dr. DEWAR—It is very important and somewhat difficult to find a material which is perfectly dry, and which has no flavour of its own which it can impart to the meat. The only two things which I know of are this potato meal and preserved blood meal. The latter is free from any odour, and when it arrives here would sell readily at 5d. per lb. for the purpose of feeding cattle and horses.

Mr. JENKINS—Would there be any difficulty in separating and collecting it?

Dr. DEWAR—There need be no difficulty about that. The blood could be saved when the bullock was killed, and both might be in the cask within 48 hours. I am told that meat in Australia will dry in the open air.

Mr. FOSTER—If you had to provide a very high temperature it would add considerably to the cost.

Dr. DEWAR—My friends in Australia say that their temperature in the open air is sufficiently high to dry a beefsteak in the course of 48 hours or less.

Mr. HOLLOND—That would only be at particular seasons of the year.

Mr. FOSTER—What was your object in mixing the sulphurous acid? Was it that a stronger mixture gave any flavour to the meat, or simply to save the material?

Dr. DEWAR—It was the result of experiment. I tried it first of various strengths, which did not answer, and I made it stronger and stronger until I arrived at the correct proportions. I find the application of heat dissipates all flavour of the acid. I am not able to speak exactly as to the temperature required to dry this meat in a dry climate like Australia, but in our climate, on a dry day in summer, a haddock will dry in 12 hours if hung up in the sun. I do not think that meat could be dried in the open air in this country—we have not sufficiently steady weather. All these specimens have been dried in the same room. The higher the temperature the better, if it does not exceed 140°.

Mr. HOLLOND—I understand you that when fish were dried in the open air the temperature must not go below 80°—What would be the corresponding temperature for beef in the open air?

Dr. DEWAR—These have all been dried under the same circumstances, but I should say that below 80° would be dangerous either to meat or fish.

Mr. FOSTER—We have been told that about 80° is the most critical temperature to which meat of any kind can be subjected, so that to prevent anything going wrong you want it higher than that?

Dr. DEWAR—Yes.

Mr. JENKINS—As I understand, two conditions are requisite to the carrying out of your process—first, a temperature above 80°, and secondly a certain amount of dryness. Can you tell us what amount of dryness that would be?

Dr. DEWAR—As near perfect dryness as possible. I have not tested it by the hygrometer.

Mr. JENKINS—For instance, it would be very doubtful if you could get the requisite conditions during a great portion of the year for applying the process to the preserving of the Cornish pilchards.

Dr. DEWAR—That could, no doubt, be secured by artificial means, which would be requisite in any case to carry out the process on a commercial scale in this country. But my aim has rather tended towards applying it to the bringing of meat from abroad rather than to preserve meat in Great Britain. Nevertheless, the time during which salmon and other fish can be procured, is materially prolonged by the employment of this process. In April last, I kept a piece of salmon twenty-two days, after six hours immersion, and then sent it to London, where it was much appreciated. Haddocks, &c., after two hours' immersion, will be found available for food days after they would, under other circumstances, have been useless. They keep best when hung in a dry current. I have sent some specimens to a friend in Australia, who wrote to me the other day that he had tasted them, and found them perfectly fresh, not at all like ordinary preserved meat. A portion which he had allowed to get damp, however, went wrong.

Mr. JENKINS—Have you any notion how much of this beef powder would make a quart of soup, and what would be the cost?

Dr. DEWAR—I have not tried that; soup varies so much in strength. But it is nearly five times as strong as ordinary fresh beef.

TWENTY-THIRD ORDINARY MEETING.

Wednesday, May 20th, 1868; WILLIAM HAWES, Esq., F.G.S., Chairman of the Council, in the chair.

The following candidates were proposed for election as members of the Society:—

Evans, Henry Sugden, 154, Holland-rd., Kensington, W.
Hawksley, Thomas, C.E., 30, Great George-street, S.W.
Pochin, Mr. Alderman, Manchester.

The following candidates were balloted for, and duly elected members of the Society:—

Compton, William, 68, Prince's-square, Bayswater, W.
King, John, 10, Hyde-park-gate south, W.
Price, Hugh Powell, Castle Madoc, Brecon.
Ward, William Augustus Hardcastle, 49, Pall-mall, S.W.

The Paper read was—

ON THE CONDITION OF THE AGRICULTURAL LABOURER.

By J. BAILEY DENTON, ESQ.,
Honorary Member of the Royal Agricultural Societies of Sweden and Norway.

At a time when the education of the wage-paid classes is receiving much public attention, and when we are just on the eve of a great political change, by which all classes will be admitted into the exercise of the franchise except one—the working class in agriculture—I have thought it possible that a few words from a member of the Society, who for many years has directed the operation of a large number of agricultural labourers, and who necessarily feels a great interest in their welfare, might have some influence upon those who are giving their attention to the means by which their condition may be improved.

Having incidentally alluded to the new franchise about to be exercised under the "Representation of the People Act, 1867," let me at once disclaim all intention to give a political bearing to the observations I am about to make. I respect too highly the standing rule of this Society, that political discussions should be avoided in this room, to break it intentionally. But though it is my purpose to treat the subject in a practical manner, I should fail in impressing upon others its full importance if, in the first place, I did not call attention to the fact that at the next general election that class of the community known as the agricultural labourer will be the only operative class which will be excluded from voting. Though, in the practical view I take of the matter, I fail to discover any reason why operatives living in boroughs should be admitted to the franchise, while operatives living in the country should be excluded, I cannot help recognising in the uneducated, dependent, and scattered condition of the latter the real reason why the country has tacitly allowed—as if by common consent—a distinction to be made between the wage-paid labourer of the factory and the wage-paid labourer of the farm. This distinction cannot have arisen because the premises occupied by the one are more valuable than those occupied by the other, for it would be difficult to say which labourer's dwelling—the rural or the urban—costs more money to provide, and it has often been shown in this room that the actual money rent paid by the farm labourer is no criterion of the value of the premises he occupies; nor can it be because the wages of the one are much greater than those of the other, for when the earnings of each are carefully dissected it will be seen that there does not exist that great difference between the two which there is generally supposed to be. It can, in fact, only arise from those causes which limit his mental abilities, and prevent his increasing the value of his labour, while they depress his status in the social scale—causes which it is the duty of the country to investigate and remedy.

But before I go into these causes and remedies, I will do my best to remove the misapprehensions that prevail as to the value of the farm labourer's occupation and the amount of wages his services command. There is much in the one that affects the other, and no effort to improve either can be successful unless we carefully comprehend the circumstances of both. The average rent of farm labourers' cottages at the present moment may be fairly stated to be rather under than over 1s. 6d. per week, which is less than £4 a year. This rent is quite as much as the majority of old existing cottages are worth, for most of them have but one bedroom, and are wanting in those accommodations which are essential to decency and comfort. Such dwellings have been, and may still be, built for about £50 each, if constructed of plaster and thatch, without regard to substantiality, and £4 a year—being 8 per cent.—may be considered a full return, if such dwellings are admissible at all. But if we have reference to those cottages which, under the influence of sanitary reform and sound estate economy, are taking the place of these miserable hovels,—which all well-thinking people condemn,—we shall find that their average cost is £160 each, or £320 the pair, exclusive of the site on which they stand. This site, which would cost £15 more, would make the fee simple value of the whole £175. We all know that every speculator employing capital in house building, looks for something like 7 per cent. if he is to replace the capital and make 5 per cent. net after paying insurance and doing repairs. If, therefore, a farm labourer paid for his occupation the rent in money which a speculator would demand, the payment, instead of 1s. 6d. or 2s. which he still continues to pay for a good cottage as he did for a bad one, would be £12 5s., which closely approximates the rateable value fixed as the qualification of a county voter, while it exceeds that of the lodger in boroughs. But it is not in money wholly that the farm labourer pays for the improved cottage, if it forms part of the farm on which he works, or is so connected with it that the farmer has command of the services of the cottager. A farmer having good cottages at his disposal can select the best workmen as his daily labourers. Moreover, he can keep them, which is not the case with the occupiers of the miserable hovels that generally exist; and as newly-built cottages are now usually placed so as to reduce to a minimum the distance the labourer has to walk, whereby time and sinew are saved, the advantages to the employer are, in the aggregate, equal to the difference between the return due to the condemned hovel and that due to the improved cottage, and thus, in point of fact, the farm labourer receives in a better home an equivalent to increased wages.

Let us now turn to the more direct earnings of the agricultural labourer, and see what they are. It appears to me that, although much has been said about wages lately, a great deal of misapprehension prevails.

It is not my object at the present moment to provoke any discussion on the principles which govern the price of labour. That is too wide a subject, and would divert our attention too much from those facts it is most desirable to establish to remove misapprehension. But, having had some considerable experience in nearly every county in England, I desire to state shortly the conviction at which I have arrived—that, measured by the real value of the services rendered by the agricultural labourers in different parts of England, the prices peculiar to different districts are as high as the return to be gained from those services will sanction. It appears to me to be a fallacy to suppose that the labourers of one district are as good workmen as the labourers of another, and that for the services of each, when applied to the same object, the same money should be paid. Still, it can only be on such grounds that the proposal lately enunciated for the formation of unions, even though "established on principles strictly defensive," among agricultural workmen, can be supported. Considering that combinations of workmen are injurious in proportion as ignorance prevails, and that the want of education is the special characteristic of the agricultural labourer, I can anticipate only the worst results from unions among them, and am quite at a loss to comprehend how any national benefit can arise by encouraging them. If the labourer of Dorsetshire or Devonshire was as able a workman as the labourer of Northumberland or Lincolnshire, a common standard of daily wages could be adopted, but the truth is that there is as much difference in the value of ordinary labour in different districts in England as there is in the character of labour in different countries abroad, and it is only consistent with economy that this difference should govern the price paid. In making this remark, however, I do not lose sight of the fact, that the price of labour must be regulated in some degree by the cost of maintaining labourers and their families in their own districts, so as to perpetuate the race upon which the produce of the land depends. With respect to the wages of the farm labourer, it has been

my duty for the last seventeen years, when reporting on the agricultural operations of the General Land Drainage and Improvement Company, to inquire into the standing wages of every locality in which works have been executed. In addition to these inquiries, I have recently made others, and have obtained such reliable information, that I believe I am perfectly justified in stating that the present average weekly wages of the farm labourer, excluding extra allowances at hay-time and harvest, and all payments for piece-work and over-time, as well as the value of various perquisites in the shape of beer, milk, fuel, &c., are as follows:—

	s.	d.
North-Eastern district	14	6
North-Western district	14	0
Mid-Eastern district	13	0
Mid-Western district	11	0
Midland district (exclusive of Middlesex)	10	9
South-Eastern district	12	0
Mid-Southern and South-Western districts	10	6

These figures include shepherds and horse-keepers, but do not include the wages of bailiffs, where they exist, nor of other special employés, nor the earnings of labourers' wives and children. They include, however, beer and cider when they form a regular daily allowance in lieu of money, but not otherwise.

The mean weekly day-labour wages of able-bodied men throughout the whole of England may be taken at 12s. 6d.

To this must be added the additional gains by occasional piece-work,* extra payments at hay-time and harvest, when double the ordinary wages is frequently given, independently of the increased allowance of beer or cider. In the aggregate, the actual income derived from these employments is equal to from 1s. 6d. to 3s. a week, according to the custom of different districts. Where piece-work can wholly take the place of day-labour, a labourer may earn 25 per cent. more than by the day. The total value of the beer and cider supplied to each labourer as his allowance, at hay-time and harvest, when employed in drilling and machine threshing, and when engaged in piece-work, if spread over the whole year, would amount to from 1s. to 2s. a week, according to locality. With these additions to his direct money wages, the farm labourer gains from 15s. to 16s. per week, taking the mean of England.

But, besides this aggregate, he gets other advantages, which are unknown to the industrial labourer living in a town. The rents of the dwellings of town operatives vary from 4s. to 6s. a week, some having very good dwellings for these rents, while others are obliged to pay as much for lodgings only. Comparing these figures with the 1s. 6d. or 2s. paid by the agricultural labourer for cottages equally as good or better than the dwellings of the town operative, the difference must be regarded as a gain to the former. The town operative seldom, if ever, has the advantage of a garden wherein he may grow potatoes and vegetables. His outlay for these essential articles of food is often great, particularly if he has many children to provide for. In fact, the ordinary payment for potatoes and vegetables by a mechanic, with a wife and three children, living in a town, is stated to be 2s. 6d. a week. An agricultural labourer, if he is fortunate enough to have —what he ought invariably to have—a rood of garden ground as part of his occupation, which he may cultivate after he has done his wage-paid work, will grow upon it vegetables sufficient to yield him a return, after payment of rent and for seed, of at least £4 a year, which is rather more than 1s. 6d. a week. I am assuming in this estimate that he has time and strength sufficient to do all the labour that is required to cultivate it, and that he is careful in storing the refuse of his dwelling, *i.e.*, the ashes, sewage and waste, so that he may avoid any payment for either labour or manure.

Thus it will be seen that from his house and garden the agricultural labourer gains advantages equal to at least 4s. per week, which, if added to his money returns, will raise his wages from 15s. or 16s. to 19s. or 20s. a-week, independent of what his wife and children may make, and this frequently adds 25 per cent. to his income.* I have said nothing about the gains of gleaning, which have been estimated at £1 1s. 10d. to 40s.; nor about the favourable difference in the cost of bread, meat, milk, &c., in the country compared with what it is in towns; nor of the benefit an agricultural labourer is said to derive from the keeping of a pig, as I am doubtful myself whether anything is fairly gained by it; neither have I estimated the great advantage of pure country air in securing the health and strength of the labourer and his family, though all these have a money value which should be considered. I may here state that for several years past I have adopted the weekly wage of 20s. as the basis of payment to the able-bodied labourers employed by the General Land Drainage Company when away from their homes during the draining season, at which time the number has frequently exceeded 1,500. The system adopted when going into fresh districts is to make the earnings of a few good practised hands, of medium capability, who follow the company's foremen wherever they go, the data for paying all other hands. The weekly work of a good gang of drainers will, if divided, give to each hand as much as from 30 to 40 rods of digging, and the price per rod will be fixed by the foreman at such an amount as to apportion to the standard men from 16s. to 22s. a-week, according to the length of the day, after paying for the repair of tools. While these figures are the wages of standard workmen, the local labourers, at the commencement of the work, will seldom earn more than from 10s. to 12s. Of course this is to be expected, and the statement is only apposite to the present inquiry, when it is said that, whenever a turn-out or a strike takes place it is invariably found to have its origin in the local men, and there are many kindly-disposed persons who take their part, though the result invariably shows that if they will only persevere they can, after a time, make as good wages as the older standard hands. With this knowledge it will be understood with what dismay I look upon the proposal of unions which can only maintain inferior work, done at an extravagant cost, and discontent at the same time.

The weekly earnings of different labourers, which fairly represent the class known as industrial operatives, may be stated to be as follows:—

Carpenters and joiners	from	18s. 0d.	to 28s. 0d.
Sawyers	„	21s. 0d.	to 26s. 0d.
Bricklayers	average	31s. 6d.	
„ labourers	„	19s. 6d.	

* The advantages gained by the adoption of piece-work in the place of day-labour are stated by one of our leading farmers, Mr. Charles Howard, of Biddenham, to be: 1. The work is done more expeditiously, at the proper time and with less supervision on the part of the employer; 2. It is less expensive than day-work, and payment is made for only the work done; 3. The labourer, finding his wage is regulated by the quantity and quality of the work performed, is more industrious, and exercises more skill in what he does; and 4. By placing higher wages within reach, the temptation to leave farm-work for other occupations is lessened.

* Mr. Purdy, in his valuable paper in the *Journal of the Statistical Society of London*, on the rate of agricultural wages, illustrates the assistance a labourer derives from the work of his wife and children by adopting Dr. Kay's figures, given in the same journal, which show the income gained by upwards of 500 families of different sizes in Norfolk and Suffolk to be as follows:—

Families.	Condition.	Average No. of children.	Average annual income.
36	Single men	...	£25 0 0
64	No children at home	...	30 6 0
166	Children under 10	3	32 6 0
120	One child above 10	4	35 4 0
92	Two children above 10	5	40 5 0
44	Three children above 10	6	45 6 0
15	Four children above 10	7	50 9 0

Brickmakers	from	24s. 0d.	to 30s. 0d.
Masons	average	30s. 0d.	
„ labourers	„	17s. 6d.	
Gardeners (exclusive of head gardeners)	„	16s. 0d.	
Smiths	from	26s. 0d.	to 28s. 0d.
Painters	average	28s. 0d.	
Boot-makers	from	21s. 0d.	to 26s. 0d.
Tallow workers (labourers)	average	18s. 0d.	
Coal miners	from	17s. 0d.	to 27s. 0d.
Quarry men (slate)	„	18s. 0d.	to 23s. 0d.
Carters	„	17s. 0d.	to 19s. 0d.
Railway labourers (maintenance)	„	15s. 0d.	to 20s. 0d.
Butchers' men	„	16s. 0d.	to 18s. 0d.
Police-constables	average	20s. 0d.	
Bakers' men	from	21s. 0d.	to 26s. 6d.
Cotton workers	average	18s. 6d.	
Silk workers	from	17s.	to 24s.

The difference between these figures, which, it will be seen, do not cover the highest grade of trade operatives, and the wages of the agricultural labourer, is too great to exist between the two main branches of the wage paid classes without making efforts to reduce it. It accounts for the fact that the population of our leading agricultural counties is decreasing, while that of other counties in which manufacturing towns exist is increasing with more than ordinary rapidity.* It accounts, too, for the deplorable truth, that while the industrial labourers of our towns are known to save money to provide for incapacity and old age, the utmost the agricultural labourer manages to do is by means of provident societies, if he is lucky enough to belong to one which is well managed, to provide for illness during his working age. In the breast of the former there exists a hope of accumulating money, and ultimately becoming a master, while the final prospect of the latter is, I regret to say it, nothing but pauperism and the union. Sad as this picture is, it is a satisfaction to know that the rate of agricultural wages throughout the country has increased within these last 35 years quite as much as 20 per cent., while the prices of those provisions and supplies which constitute the ordinary food and necessaries of life have, on the whole, decreased in the aggregate about ten per cent. The price of meat and cheese has increased within the last few years at an extraordinary rate. This is partly to be accounted for by the prevalence of diseases amongst cattle; and it is a curious fact that just 50 years ago the price of the best meat was the same as at this moment, though if we only go back half that time—25 years—it was about 40 per cent. cheaper. Inferior meat has not been liable to such changes, though there has been a rise of 2d. per pound. Bread, though high in price at this moment, remains at much the same cost as it was before the repeal of the corn laws. Beer, though nominally cheaper, is so much worse in quality that we cannot regard it as actually reduced in cost. Tea, coffee, sugar, and groceries generally are 50 per cent. less than they were 50 years ago. Clothes and shoes are equally cheaper. The cost of fuel, on the whole, is less than it was 35 years ago.

Though I hope I have shown that the position of the agricultural labourer is not so bad as many represent it to be, no one can say that it is quite satisfactory; but with the profits of farming as low and uncertain as they are, it will be acknowledged that the only way to justify an increase of labourers' wages will be by rendering the value of the labour given greater than it now is. Active hands, directed by superior intelligence, already obtain wages above the mean of 16s.; and as there is greater scope in agriculture for the exercise of judgment than perhaps in any other trade or pursuit, in which physical labour forms so great an element, owing to the diversity of its objects and the casualties which may affect them, there is no reason to doubt but that with an increase of knowledge on those points which alone can enhance the value of labour, the earnings of the whole class may be increased.

This directly brings us to the subject of education and its influence on the agricultural labourer by bringing his mind to bear on his physical duties.

The state of education among agricultural labourers was truly indicated by the Royal Commissioners appointed in 1861, to inquire into the state of public education in England, when they said that in the British Army, which, I believe, is chiefly made up out of the agricultural class, "out of 10,000 soldiers examined in 1856, more than one-fourth could not write, and more than one-fifth could not read, while in the British Foreign Legion, raised in 1855, four-fifths of the Italians and 97 per cent. of the Germans, could both read and write." Those, however, who are brought often into contact with the English farm labourer, as I happen to be, require no statistics to prove the almost total absence of education that exists among them. We can only wonder that with a nation so advanced in civilization as our own, such a condition of mind should be allowed to lower one particular class without a general effort on the part of all other classes to improve it. But the want of education is not to be wholly attributed to national apathy and indifference. It is due to various causes special to rural life, but perhaps the most powerful of all is, the belief that existed largely at one time, and still lingers with some few farmers, that education disqualifies a labourer for manual work in the field. This belief had its origin in the little education possessed by the majority of farmers in times past, though at the present time there is no class more quickly awakening from indifference to the benefits of knowledge than the farmers. Moreover, they are not as a class to be blamed wholly for past indifference, for there were many landowners who themselves preferred men as tenants on their estates who were not possessed of those attainments which qualified them to appreciate education in their labourers.

Not many years back it was a common thing to exhibit less care for the comfort of the labourer than for the comfort of cattle; better buildings, indeed, were provided for the cows than for the labourers. But this state of things is happily gone by.

I will not here dilate on the manner in which the children of the labourer should be taught at school, nor enter upon the arguments for and against compulsory education. I am content to express my conviction that primary education at school—consisting of reading, writing, and arithmetic—is essential as the basis of improved practical knowledge, even though it be called forth in the duties of a labourer; and that, as public attention has at last been aroused to the object, the good sense of the country will rightly determine how it shall be attained. To confine our efforts, however, to elementary school learning would, I contend, fail in the object we all desire—which is, to see the farm labourer earning more money by labour of greater value to his employer. To do this, technical—that is, practical—education must be associated with primary school teaching. Technical education, I believe, has been more than once explained in this room to mean, practical tuition in those operations which men are called on to perform in the business of life. It is, however, a term that has been exclusively used in connection with the arts and sciences, and those businesses in which mechanical and chemical science have been mixed up. In agriculture I believe the term has never been used; but perhaps in no calling is technical education—

* The population of Lancashire has increased from 2,031,236, in 1851, to 2,429,440, in 1861, and Staffordshire from 608,716, in 1851, to 746,943, in 1861; whereas the population of Cambridgeshire has decreased from 185,405, in 1851, to 176,016, in 1861, and Norfolk from 442,714, in 1851, to 434,798 in 1861. Mr. David Chadwick stated, in his paper, "On the wages of Manchester, Salford, and Lancashire," that "the wages of nearly all classes of factory operatives appear to have increased from 10 to 25 per cent. during the last 20 years."

if by that term we properly express practical education —more required.

I will endeavour to make this understood. There is not a farmer in the country who, be he engaged in sheep farming or in dairying, in tillage, or in mixed farming, does not know the superior value of a labourer well acquainted with special duties. Take, for instance, a shepherd. The wage of a good shepherd is 16s. a week, besides perquisites; and I venture to say that, at this moment, there is hardly any other description of agricultural service in which there are fewer capable men. A good shepherd is one of the most difficult men to obtain, and the loss to individual farmers, and to the country generally, from the want of them is very great.

Again, good horse-keepers are almost as difficult to obtain as good shepherds. From my own experience I can say that the difference between a good horse-keeper and a bad one is not to be measured by the simple difference between scanty and liberal wages. Any one accustomed to horses knows immediately, by the appearance or the touch of their skin, whether the man in charge of them knows his business; and he will confirm my opinion that any difference in wages will be more than counterbalanced by the saving in the corn which horses will consume, and the service obtained from them when well attended to compared with that when they have been indifferently treated.

The same remark will apply to the tending of neat stock. Speaking again from my own experience, I have found that cattle under the charge of a man who thoroughly understands them, will fatten quicker, and in every respect do much better with less food, than under a man who, from attempting indiscriminately all the duties of the farm, is master of none. In the minor matter of poultry, I have known many pounds lost by the want of proper treatment of them; and many a labourer's wife with a small plot of ground, who has brought intelligence to bear, has raised more poultry in a year than has been produced from a farm of several hundred acres. If this be admitted to be the case with live stock, it will be unnecessary for me to point out the advantages of employing men in the use of implements who have taken pains to understand them. The loss sustained by farmers from the careless treatment of costly implements is great. Few labourers know how to adjust them if they get out of order, and one who thoroughly understands the steam-engine so as to take charge of it when ploughing land or thrashing corn is indeed a prodigy in his parish. And why should we dread the purchase and use of steam-engines on our farms, on the ground that we have not a labourer who could take care of them, when tuition in youth would supply the omission? It is true that my friend, Mr. Howard, of Bedford, now and then undertakes to tutor a farm labourer in the management of the engine, if he is previously assured of his intelligence. This circumstance, while it shows how an individual difficulty may be overcome, must go some way to prove that technical education is to be attained in the lowest grade of agriculturists, as in the more refined artisan class. It would be tedious to pass through all the branches of a farmer's business, to show how technical knowledge in the labourer would apply. There is hardly an operation in tillage that would not be done better, if the operator had early understood it. Take the simple operations of ploughing, drilling, and sowing; is not a good workman worth 1s. or 2s. more per week than a bad one. The same observation applies to hedging, ditching, draining, and thatching, in which there is no comparison between an expert man and an unpractised one. I have myself sent miles for a good thatcher or hedger.

How, then, are these practices to be taught in youth? I will do my best to explain.

The only reasonable ground for keeping the children of an agricultural labourer from school, is the circumstance that, having hungry stomachs to fill, and active bodies to clothe, they must earn something to pay for the food they eat, and the clothes they wear; and so weighty is this excuse with some men of high position and character,, that they are led to doubt the policy of compelling attendance, even for the limited number of hours yearly which it is proposed the children should be at school. Still, so essential is primary knowledge, that we may with certainty assume that this objection, weighty though it be, will give way to general opinion, and what I would suggest would be, that those children who attend school for the limited time determined upon, should, when earning their food and clothes by labour, be placed in a situation to obtain fundamental technical —or, if it be better, to call it practical—knowledge on the farm; not by placing them indiscriminately one day to do one thing and the next another, merely to meet the convenience of the moment, but by putting them for a sufficient time under the shepherd, or the horse-keeper, or the stock-keeper, or the dairyman, or the engineer, or the hedger and ditcher, or the thatcher, that they may learn, as far as such labourers can teach them, the duties of their future calling. The only difference between the present system and that which I would suggest would be, that a youth employed on a farm should be so systematically engaged that he should early learn, by a species of apprenticeship, all that can be practically taught upon it, and that the shepherd, the dairyman, or the engine-man, as the case may be, with whom he should be placed, should receive a bonus for teaching him all he knows. In order to be assured that these teachers deserve their bonus, the youths should, at certain periods, undergo examination, and, where it be practicable, be made to compete with other youths for prizes. All that would be required in the way of national, district, or outside aid, would be the provision of qualified examiners, and the means of paying the teachers their fees, and the youths their prizes. Already we have throughout the country, in the autumn, matches in ploughing, ditching, and draining, and the interest that the labouring men take in the competitions, may be taken as some proof that, under proper control, competitive trials may be extended to farming youths engaged in various agricultural duties. The payments to the labourers for teaching, and the youths for learning, would each act favourably in maintaining superior services on the farm, and thus the farmer himself would naturally become interested, and would give his support to the system. Youths would gain at one and the same time primary education at school and practical information on the farm, and the two descriptions of knowledge would tell with increasing advantage upon each other, and would finally effect what is really wanted—an improvement in the quality of the labourer's work, so that he may command increased wages for that work from his employer.

At present the Beer-shop is a great bar to the improved condition of the agricultural labourer. The influence of drink on an uneducated mind cannot be better shown than by the fact, that beer or cider will go much farther than its equivalent in money in inducing men to exert themselves, although the money could be taken home by the labourer for the benefit of the wife and children as well as himself, while the beer or cider if drunk, is dissipated in selfish indulgence. The quality of the beer and cider sold in the lowest-waged districts is the worst. The beer is seldom if ever genuine, and its effects are not to be measured by its immediate action on the system. It tells equally upon the physical energies of the man as upon the moral powers of his mind. The quantity of beer drunk in the hay and harvest time would surprise many of my hearers, though in the ordinary disbursements of a labourer—as ascertained by Mr. Purdy, of the Poor Law Commission—only one instance appears on record in which an expenditure in beer has been entered. I presume that case was the only one in which the wife had partaken of it as a necessary item of food. It is nevertheless true, that during harvest every able-bodied male labourer drinks beer which costs

from 8d. to 1s. a day, taking the average of harvests in the eastern corn-growing counties. I should be sorry to condemn beer as an article of food when properly made with good malt and hops, but that article is seldom to be met with. The liquid sold as beer in rural districts satisfies thirst at the time, and provokes it as soon as drunk, and it takes more vital strength out of the man than it ever supplies. I cannot speak too strongly against the prevailing excessive use of bad beer and cider. It is the bane of the farm labourer. In those counties in the west of England where cider is used instead of beer, the impoverished condition of the agricultural labourer is even worse than where beer prevails. His inferiority in work is mainly to be attributed to the bad character of the cider, and the excessive use made of it. There is some proof of the injurious influence of excessive drinking, in the fact that in all the worst paid districts—where labour commands the lowest wages, and where those wages are all that the labour is worth—the publican and beer-seller bear a far larger proportion to the number of agricultural labourers than is the case in those districts where the wages are higher and where the labour is more valuable. We often hear mentioned the low rate of wages in the county of Dorset, and comparisons are made with the wages ruling in other counties. When we turn to the statistics giving the occupation of the people in the population returns of the last census, we find that whereas in Lincolnshire, which I select as the best-cultivated county in England, the number of agricultural labourers is 52,871, and the number of people living by the sale of beer is 1,317, in Dorsetshire the number of agricultural labourers is 19,434, and the number of persons selling beer and cider is 582, showing a proportion in the former case of one beer-seller to 40 agricultural labourers, and in the latter, one beer-seller to 33 labourers.

The proportion in Lincolnshire is much too high; but what is to be said of Dorsetshire, where the labourers, earning only two-thirds of the wages of Lincolnshire, support a larger proportion of beer and cider sellers? The figures given, moreover, do not fully represent the real state of things as regards the extent to which the beer and cider is drunk in Dorsetshire, as in that county a great deal of cider is given in lieu of money wages, whereas in Lincolnshire no such regular practice prevails either with respect to beer or cider.

But I can illustrate this important part of the question by stating a case, within my experience, which can hardly fail to exhibit the fact that low wages and inferior work are associated with a preponderating use of beer or cider. In the year 1852 I had the control of some extensive drainage works in Dorsetshire, and at that time the agricultural money wages of the district ranged from 7s. to 9s. a week. Impressed that such pay was inconsistent with suitable labour, I imported into the work some north-country labourers from Northumberland, practised in draining, to afford an example for such local men as chose to enter the trenches and dig by the piece. I guaranteed to the northern men a minimum of 18s. a week, although I could command the services of as many Dorsetshire labourers as I desired to employ at half that price. The result showed that I was right in bringing high-priced competent men amongst low-priced inferior ones, for as soon as the Dorsetshire men knew what the north-country men were getting, and saw the character of the work executed by them, they applied all their energies in imitation. At first they drank more beer, thinking that by such means they could do more work. They soon saw their error, and it was both amusing, and instructive at the same time, to see how struck they were when they found that the northern men had for their dinners good meat and bread, while they were living on bread, tobacco, and miserable beer or cider. It was by very slow degrees that the Dorsetshire men realised the truth that butchers' meat was more strengthening than bad beer. Eventually, by the example afforded them, the "technical education" given them by the Northumberland men, and by the effect of improved food, the despised Dorsetshire men were enabled to earn as much as their teachers, and it was not long before I actually removed them into the north of England, to compete with Yorkshire men in the work they had learned; and the first place at which they were engaged was Swine, in Holderness, where there did not exist a publichouse or a beershop in the village!

I have given these details, hoping they will serve two objects—by proving, first, the evil of beer and the good of beef; and, next, the benefit of technical or practical teaching as a means by which the quality of labour may be improved, and the earnings of low-waged districts increased.

If this experience of mine fails to convey what I mean I can perhaps show that inferior work, low wages, and excess of drink are attended by a greater amount of pauperism than belongs to districts where better labour, higher wages, and less beer prevail, by quoting from Mr. Purdy the result of figures he has given in his paper published in the *Journal of the Statistical Society* (vol. xxiv., p. 346), which show that whereas, in an example district in Dorset and Wilts, where the weekly wages were 9s. 6d., the rate of relief to the poor was 8s. 2d. per head on the population, in a similar district in Cumberland and Northumberland, where the weekly wages were 14s. 6d., the rate of relief was only 5s. 5d.

Thus far I have spoken of those means of improving the condition of the agricultural labourer which will depend on himself and the force of education gained at school and on the farm. There are other means, however, by which the higher and middle classes in rural parishes may render material aid while the seeds of education are taking effect. I have said *may* render aid, because all Englishmen resist compulsion; but I feel those words are hardly strong enough when applied to some objects. I would rather say, will be induced to render aid by the influence of public opinion. I refer to four principal objects; first, to a more general substitution of good cottages for bad ones—cottages which will secure health and comfort in the ordinary living department, and provide separate bedrooms for the parents and children of different sexes, so as to secure comfort and decency, which have hitherto been incompatible with the dwelling of the farm labourer; second, the provision of a proper means for the drainage of villages and cottages, and the utilisation of the refuse which may be discharged from them. This is a matter upon which little has yet been done. We have drained large towns, and discharged their sewage into the rivers, a practice which the country has determined shall not be continued. At present we have not entered upon a mode of dealing with the sewage of villages and small communities; and whether it will be by the introduction of the dry-earth system (Mr. Moule's), or by any other process of utilisation, yet remains to be determined. The dry-earth system commends itself to the minds of many as the most suitable for villages, because each resident may preserve the refuse of his own cottage for the benefit of his garden without injuriously affecting his neighbour; and this being a very desirable object, the problem has to be solved how, by combined action, all the residents of a village may be brought into one common system of proceeding. As the wage-paid labourer cannot of himself do this, it would appear positively necessary that the owners of village property should take the initiative. Third, the supply of pure wholesome water in quantity sufficient to secure cleanliness and comfort to villages and cottages. I have already addressed the Society upon this important object,* and will abstain from repetition. The supply to large towns is an easy matter, compared to the provision of villages and small communities. But with our whole water supply undergoing change from causes we cannot

* *Journal*, vol. xiv., p. 17.

control, and our village cottagers called upon to pay as much as a penny per pail for water, the subject must soon receive attention. And, fourth, the provision of ground for the recreation of those children which it is by common consent, determined should be educated.

I will now address myself to those objects in which the upper and middle classes of rural parishes may voluntarily assist the lower class. Foremost amongst them are benefit societies. Of all things which the labouring man most dreads is his condition in his last days. By subscription to local societies (if well managed) a labourer may, under the present state of things, contrive to obtain the means of support if sickness overtakes him, but a provision for old age is an object which very few agricultural labourers secure. If the earnest interest of the upper classes in a parish could be manifested by taking a part in the management of benefit societies, very great good would attend them, and it would no longer be said that out of the 23,000 friendly societies which exist in England and Wales, there are not 20 solvent. By importing into the mode of management the agency of the post-office as a means of securing safety of deposit and of insuring allowances in sickness and old age, as has been proposed by the Rev. J. Y. Stratton, in some interesting articles written by him in *All the Year Round* (April, 1866), and in *The Cornhill Magazine* (February, 1864), the extension of such societies would follow. It was with a view to gain this advantage that the Kent Friendly Society memorialized the Postmaster-general last year, and I believe with good effect. All persons who have given their attention to the matter concur in objecting to the meetings of friendly societies at public-houses; and if the higher classes would really take an interest in them, the practice would be discontinued. "Sometimes," says Mr. Tidd Pratt, "the club is sold with the good-will of the house." Beer-house clubs are indeed a great abomination.

Some few existing societies are excellent precedents for the establishment of others. The Essex Provident Society has enrolled between nine and ten thousand members, and has a capital of between £70,000 and £80,000; and the Hampshire Friendly Society has upwards of 3,000 members and a capital of £35,000. The Hitchin Friendly Institution, established in 1828, is, perhaps, based on as good a foundation as any in the country, as every member who insures against sickness is also compelled to insure for a pension in old age, an object declared by Mr. Hawkins, its founder and great supporter, to be of "vital importance if the wage-paid classes are to be taught the advantage of respectability in providing for themselves when past work without application to the parish."

The next object in which the higher classes can help the lower is in establishing and maintaining garden allotments under a provident system of management, by which a labourer, having allotted to him a rood of land, may pay, during his active life, a rent more than sufficient to satisfy the landowner, but which it is quite worth his while to pay, to secure the profit which the gardening of a rood of land will give. In the majority of cases a landowner who would not let a single rood of land to the labourer, would let a plot of many acres to the parish authorities, and would be quite satisfied in receiving say £2 an acre, tithe free, which is equal to 3d. a pole or 10s. a rood. If the labourer paid 6d. a pole, or £1 a rood, tithe and rate free, he would be paying double the acreage rent that would satisfy the landowner, and if the surplus was invested through the same agency as that of the "Post-office Benefit Societies," it would accumulate so as to provide the rent of the land after a certain number of years, whereby the labourer in his latter days would hold the land rent free. Thus he would insure one means of support. But such an advantage can only be gained by the combination of the more wealthy parishioners, who together might become security to the landowner for the principal rent.

Again, village hospitals and infirmaries, enabling the labouring class who have lived a worthy life to gain proper medical advice and nursing at home, are working well where properly managed, and are fit objects for benevolent co-operation.

But besides these there is still another, in which the upper classes may do much good. We have recently heard much of co-operative societies for reducing the cost of provisions and preventing extortion on the part of London tradesmen. Without entering upon the question of whether such societies are desirable or beneficial for those they were originally intended to assist, it is quite certain that a modification of them may, with great advantage, be carried out in villages for the supply of food and clothing to the labouring population in rural districts. At present there has been very little experience in co-operative stores in villages. There is no doubt, however, that the small wages of the agricultural labourer are much reduced by tribute to the local tradesmen; and with so little to spend as the labourer has, it is indeed desirable that that little should purchase as much as it can be made to do. One condition would be paramount, and that would be, that ready money should be the only means of purchase, but as this requirement would produce provident and careful habits it could not eventually militate against success.

Associated with co-operative stores there might be established a common kitchen and bakery, at which food might be cooked with economy, and a better knowledge of cooking among labourers' wives acquired. Several efforts of this character are now being made in various parts of the country, but I am not in possession of sufficient information to speak of the results.

I trust I may be allowed to close my remarks with an acknowledgment of the assistance I have received from numerous correspondents; among them I may mention Mr. Lawson, of Northumberland; Mr. Briggs, of Yorkshire; Mr. Skelton, of Lincolnshire; Mr. George Jackson, of Cheshire; Mr. Charles Howard, of Beds; Mr. Squarey, of Wilts; Mr. Morris and Mr. Castree, of Gloucestershire; the Rev. Prebendary Brereton; Mr. Sturge, of Bristol; Mr. Fowler, of Bucks; Mr. Mechi; the Rev. J. Y. Stratton; Mr. Charles Whitehead, of Kent; Mr. Whitting, of Cambridgeshire; Mr. Hagger, of Liverpool; and Mr. James Webb, of Worcestershire.

DISCUSSION.

Mr. FREDERICK WOOD said that, much as he admired the masterly and able essay which he had listened to with much pleasure, he must say, at the risk of being considered a Malthusian, that one of the greatest causes of the miserable condition of the agricultural labourers had not been noticed, viz., their early marriages. It was generally the practice of farmers if they had occasion to dismiss any hands, to select those for dismissal who were unmarried, and this, and the miserable condition of bachelor farm labourers, drove them to marry much earlier than they otherwise would. He was afraid there would be no real improvement in the condition of agricultural labourers until they were taught to look with more forethought upon so important a step as that of marriage.

The Rev. J. Y. STRATTON could heartily say amen to the remark of Mr. Bailey Denton, that beerhouse clubs were a great abomination. He had also stated that while the manufacturing operative had the hope of bettering his condition, and even of becoming in course of time an employer, the agricultural labourer had no such hope or object; and if he joined a benefit society, it was not one which would render him assistance in old age. The agricultural labourers of England looked upon the poor-rate as a kind of rent charge, in lieu of that rood of land which Mr. Denton very properly wished to see them employed upon; and this was, no doubt, one reason for the early and imprudent marriages which had just been alluded to. He believed that, on the average, farm

labourers married at the same age as members of the peerage, whereas, it would be found that, as a rule, professional men found they must wait ten years longer before they could establish themselves. He did not wish to find fault with the Poor-law, but he believed that in the next session of Parliament a commission would be appointed to inquire into the whole subject. This had been alluded to by Lord Lichfield, in moving the second reading of the bill relating to friendly societies, which bill came to an end on the previous day, after a most interesting discussion in the House of Lords. The usual form of benefit societies in rural districts was what was termed a sharing-out club, which came to an end and was re-constituted every year, a contrivance by which the burdensome and aged members were got rid of and became ultimately dependent on the poor rate. It was easily capable of proof that, on many of these sharing-out clubs, men spent more money than would support them in old age, and in greater comfort than was afforded them under the poor law. It was estimated that even in the present unsatisfactory condition of the vast majority of friendly societies, two millions a year were saved to the poor rates by their agency; and this was enough to show what might be expected if an improved system could be introduced. Knowing pretty well the difficulties in the way, a farm labourers' society, in which he held office, one of the oldest and best friendly societies in England, some time ago memorialised the President of the Poor Law Board, pointing out the difficulties which were experienced in carrying out that law, and a memorial was also sent to the Postmaster-general, asking for some system of Post-office friendly societies. This proposal was worthy the attention of all those who were endeavouring to ameliorate the condition of the working classes. In conclusion, he would refer those interested in the matter to a pamphlet which he had published,* entitled "Friendly Societies *v.* Beer-house Clubs," which contained many important facts.

Mr. C. S. READ, M.P., as a tenant farmer and a large employer of labour, felt that he ought to thank Mr. Denton for the very excellent paper he had laid before them. He wished such a paper had been read at the meeting recently held at Willis's rooms. He attended that meeting, and from statements made there it might almost be inferred that the English farm labourer was the most down-trodden being under the sun. One of the principal things there advocated was the establishment of trades' unions, which had been so thoroughly denounced in the paper that he need not trouble the meeting further about that question, except to say that, in his opinion, much of the effect of unions was already attained by the general employment of agricultural labourers by the day; the main objects of unions was to do the least amount of work and receive the largest amount of pay, and that was really the effect of employing labourers, as was almost exclusively the case, by the day. Another scheme put forward was that of co-operation. Now co-operation between the employer of labour upon a farm and the employed, was visionary and impracticable; but there was one species of co-operation which would no doubt be successful, and that was the introduction of piece work, by which the greatest amount of work was done in the shortest time, and in the best manner. By this system a farm labourer could easily earn 25 per cent. more than on day work; it was usual in Norfolk to pay £6 a month in harvest time, but in putting out his harvest work by the acre, he (Mr. Read) found that his men could earn £7 or £8 a month. There was another matter which deserved special remark, viz. that although labourers in some districts only got nine shillings a week, and in others eighteen shillings, it was quite possible that the last-mentioned earned his money, and that the former was over-paid for the work he did. It should also be remembered that when men were spoken of as receiving 8s. or 9s. a week in the west of England, they often had perquisites which were worth 5s. a week more. There was no doubt that the old poor laws engendered and encouraged pauperism; and he feared that the present law, as it was too frequently administered, would have the same effect, though in a more limited degree. He believed that since the passing of the Union Chargeability Bill, granting of out-door relief had not been watched with the same careful scrutiny as heretofore, individual ratepayers not having the same interest to look sharply after it; he thought the practice of giving out-door relief was increasing, and ought to be most jealously watched. The people of this country ought to be taught not to look to the operation of the poor law for their support in old age; and to this end the upper and middle classes ought to do all in their power to encourage good, sound friendly societies. Beerhouse clubs were really a curse to the labouring man, instead of a benefit, and generally failed just at the moment when they were most required. On the other hand, they must not go to such a rigid extreme as to disgust the labourers; for to men who had but few holidays, a harmless frolic once a year on club day was very wholesome, and tended much to increase the popularity of the club. There was another fact mentioned in the paper which he considered of some importance, that 25 years ago meat was 40 per cent. cheaper than at present; it was just about that time when they began to import foreign cattle, and the result, therefore, appeared to be that they had introduced foreign diseases, that farmers had lost a vast amount of cattle, and that the public had to pay much more for their meat. Mr. Denton seemed to think it rather strange that agricultural labourers were not admitted to the franchise; but they must remember that while the borough qualification had been reduced only from £10 to about £4, that for counties had been reduced from £50 to £12; and if the present bill was spoken of as a leap in the dark, he considered that one which would give the franchise to the agricultural labourer would be taking a jump into the bottomless pit.

Mr. HOWARD said the gentleman who had spoken of the evils of over population could hardly have had much experience in rural districts, or, at any rate, he could not have had to harvest some 500 acres of corn. The truth was, that we were beginning to feel the evils of under population. There were so many excellent points in the paper that he was very reluctant to take exception to anything, but he certainly thought that rather too bright a picture of the condition of the rural population had been painted. There were yet sadly too many villages and districts neglected by those whose duty it was to care for them; and the noble example set by the Duke of Bedford and others in covering their estates with excellent cottages and schools had not been followed to anything like the extent it ought to have been. There was no doubt that the condition of the agricultural labourer had much improved during the last 25 years, and this he attributed, in a great measure, to the improved system of agriculture, under which there was much more demand for skilled labour than in the primitive system which it had superseded. The introduction of Swede turnips, and a regular system of root culture, had added millions to the national wealth, by enabling the farmer both to grow more corn and also to feed more stock, and this had improved the condition of the labourer, not only by finding employment for a larger number during the summer, but also by providing them with something to do in the winter, when otherwise they would have been idle. The greater facilities for travelling, our large public works, railways, and land drainage had also had something to do with this state of things, and the introduction of machinery upon farms had had a great influence—having broken down that dead level which so long existed in the rate of agricultural wages. When a man was employed to swing a flail which only cost a shilling, 2s. or 3s. a-week difference in wages was a great consideration; but when

* Ridgway, Piccadilly.

the same man had to attend to a threshing machine which cost £400, a difference of a few shillings to a steady, skilful, and trustworthy man was a mere bagatelle. So with the steam-plough; men were now paid more for sitting on a steam-plough and directing its movements than they formerly were for breaking up the stubborn soil with great labour. The condition of the English labourer contrasted very favourably with that of the French peasant, who, as he had found from frequent observations last year, was generally on large farms, in the receipt of about 1s. 7d. a day, for which he had to work from 4 o'clock in the morning until eight o'clock at night, and under such circumstances it was not very surprising to find that most of the men were unmarried, and their whole condition was about as comfortless as could well be conceived. Notwithstanding what had been said by the hon. member for East Norfolk on the effect of the Union Chargeability Bill, he believed it would have a material influence for good on the future of the labouring population. Under the former state of things landlords had a direct inducement to pull down cottages instead of building them; but under the present system all that was changed, and this was very important, for one of the main things which ought to attract the attention of the landed interest was how to increase, not only the number but the quality of the habitations of the poor. Under the present Act the labourer was freed from the serf-like necessity which bound him to his own parish, and he was able to travel over the union in search of employment, and he (Mr. Howard) hoped the day would soon come when this limit would be yet further extended.

Mr. C. S. READ asked leave to explain that he did not object to the principle of the Union Chargeability Bill, but only to the mode in which relief was too often administered under it.

Mr. J. K. FOWLER (of the Prebendal Farms, Aylesbury) said that Mr. Denton, in his excellent paper, had travelled over so vast an area, that he hardly knew what particular points to touch upon. Beginning with the question of labourers' dwellings, he believed that was one of the most difficult that had to be considered. They had heard what was the cost of a decent house, and he need hardly say that it was impossible for an agricultural labourer to pay, as rent, interest even on £140. He had had through his landlord to build one or two cottages, and he found they cost from £130 to £140 each—for they ought all to have three bedrooms—and this represented a greater rent than the men could pay; but he believed the tenant farmers would willingly co-operate with the landlords in this matter, and take upon themselves the rental of any reasonable number of cottages, to be included in the rent of the farm and buildings, which they would let to their men at a moderate rent, and also give them garden ground to cultivate. He gave each of his labourers half a rood of the best land on the farm, as near as possible to the farmyard, and told them to take whatever manure they wanted, and once a year, when "harvest home" came round, they had a little exhibition of the garden produce. All this had a most excellent effect in keeping them from the beerhouse, and in encouraging habits of independence and industry amongst them. The question of wages was one that would settle itself, especially where a man was no longer tied to his own particular parish, but allowed to go to an adjoining one, where he thought he could find a better master or higher wages. With regard to what Mr. Denton very appropriately named "practical education," that was a point which could not be too much insisted on. Being very anxious that a good ploughman in his employ should be taught even further excellence, he got his friend, Mr. James Howard, to have him taught, and the result was that at the next county ploughing match he won the first prize, and a great deal of attention was excited amongst the other men to see how he set his plough and went to work. He believed that the agricultural labourer, if properly educated, might be made as good a skilled labourer as any man in the manufacturing districts. He (Mr. Fowler) was now using the steam plough, and every man engaged in attending to the machinery, including the one who drove the engine, was, a few years ago, an ordinary agricultural labourer. Mr. Denton had spoken of bakeries for the benefit of the men, but he did not see why they should not have public breweries as well, so as to avoid the bad beer so much complained of, only it would be quite necessary that the present oppressive malt-tax should be removed. The supply of water to the dwellings of the poor was of even greater consequence than that of beer, and should never be overlooked in the erection of cottages.

Mr. C. WREN HOSKYNS said the last speaker had touched a point which he considered of great importance—namely, that he anticipated the time when the tenant farmer would look upon the condition of the labourer as matter for special arrangement and understanding between himself and his landlord. He considered this of great importance, because he regarded the whole question very much from a point of view which had not been touched upon, and which he could not pass by in absolute silence —namely, the position which, in regard to the constitution of the whole order of English society, the agricultural labourer held in the body corporate. They had a body of laws relating to landed property, which were peculiar to England, which they had attempted to enforce upon the colonies and to establish in India and America, but which had broken down in each of these instances, and which existed in no other country in the world with the exception of portions of Austria and Russia; he referred to the laws which tended to the aggregation of land into large and still larger territories — he could not call them estates —of from 5,000 to 10,000 acres, and which it was morally impossible could be farmed by the proprietor. It had, therefore, to be let out in portions to tenant farmers. If these tenancies existed for the term of human life, or even for twenty-one years, or any such term as would give something like a feeling of proprietorship, it would matter little who the owner of the soil might be in reality; but at present the effect was to make all the efforts of the farmer point to those discoveries which suited his circumstances, and would enable him to make the most out of the land in the shortest time. He admitted that this system was very satisfactory to farmers and proprietors; but there was one individual who would raise his voice against it if he had the power, and that was the one whose condition they were discussing—the agricultural labourer, whose position was such, that he did not come in contact with the owner of the cottage which he inhabited, or of the land which he tilled. The tenant who employed him, held his lands under such conditions as compelled him to make the most out of it in a short time, and with the least expenditure of labour; and, under these circumstances, he did not stand on an equal footing with the man who came in contact with the actual owner of the soil; and, in fact, those men who were employed about the gardens of the proprietor, were always in a better position, had better wages and dwellings than those who worked for the tenant farmer. The latter was not able really to influence the condition of the labourer; the cottage in which he lived did not belong to him; the farmer might leave the farm and the labourer stay, or the labourer might leave while the farmer stayed; there was no life-long relation between them of that kind which rendered the man's condition an improving one, because of his labour becoming more appreciated. He thought however their condition was capable of great amelioration, and no doubt machinery operated in agriculture the same as in trade, though the conditions were not exactly alike, because in the one case there was the power of almost unlimited production, while in agriculture the production, though not so limited as some might suppose, had a definite limit. He should most gladly see any

system established which would improve the condition of the agricultural labourer, but he thought more good would be done by commencing at the other end of the chain of causes, and endeavouring to obtain some alteration of that system which was tending to larger and larger aggregations of estates. One point in the paper and discussion he had noticed with much pleasure, the importance of technical or practical education. He had himself seen the work of a farm done altogether inefficiently, simply because every one was trying to do everything, and because the system seemed to be a miscellaneous one by putting any man to any employment. If there were more subdivision of labour on farms he was certain good results would follow, and one of the main advantages of technical education would be that each man would be able to do at least one thing well, instead of a great many things indifferently.

Mr. S. SIDNEY said this subject had been so often discussed by gentlemen who took merely a picturesque view of it that he felt much indebted to Mr. Denton, who had had great experience, for giving them some facts upon which they might depend. It was not sufficient to point to other countries, where labourers were worse off; our system of government was worth nothing unless we could apply some means of improvement to what was allowed to be unsatisfactory. The great point in which our government excelled was that it was progressive; it appeared that the condition of farm labourers had progressed, and was much better than it was at the close of the great war, when there was a very bad system of poor laws, and when the condition of the agricultural labourers was really nothing better than that of serfs. As to their present position, taken as a whole, although there might be exceptions, the labourer always looked forward to ending his days in the workhouse, and the exceptions were in cases where employers took more than usual interest in their workpeople. As long as this was the state of things it could not be considered satisfactory. He did not believe, however, that it could be suddenly altered by any Act of Parliament or philanthropic movement; he quite agreed with the observations which had been made as to the fruitlessness of encouraging the labourers to combine, and thought the gentlemen who took part in the meeting which had been referred to by Mr. Read were not so wise as well meaning, but at the same time Canon Girdlestone had proposed one of the few things which would really do the labourer good; when he found that in one parish or district the wages were very low indeed, he recommended the men to go elsewhere, and that was just what caused the great superiority of mechanics to farm labourers; they were much better educated, not so much in the way of reading and writing, but in knowledge of the world, and how best to provide for themselves, and improve their condition. The agricultural labourer must not be limited to the mere bounds of his parish, as was now too often the case. In dealing with millions of people the only way to help them was to teach them to help themselves, and the essential point was to give them that sort of education which would make them desire more. Without speaking disrespectfully of his friends, the farmers, it was but too true to say that their predecessors were anything but alive to the advantages of education; they did not like a labourer who had an idea beyond his own parish. The whole system of the poor laws was calculated to produce the same effect, and prizes even were given to the man who had been the longest time in one situation, which was about the most mischievous thing they could offer a prize for, as travelling was one of the best means of increasing knowledge. He did not doubt but that, with the impetus now given to education, farm labourers as a body would learn to read, and then they would soon find the advantage of technical education, and would co-operate with the farmers themselves in becoming more intelligent and useful labourers. There was no question as to the advantage of giving them plots of land to cultivate, but that must come from the farmers themselves. They had heard about the scarcity of labour, and before long he hoped they would hear of farmers meeting to consider, not as they once did, how much they should give to married men, and how much to single, but how they could get more good labourers into the parish. He was rather surprised at the remarks of the last speaker as to our land system, for however detrimental it might be in some respects to have land held in few hands, in countries where it was much subdivided the condition of the labourers was most wretched. In the Flemish part of Belgium the land was cultivated in small holdings, and with the greatest economy; and the peasant submitted, in the matters of food, clothing, and work, to what in England would be considered absolute misery. Another important fact was this, that the English system, whatever defects might be attached to it, had been the author of all the agricultural improvements of Europe; and the reason was obvious; it was only where a man had large capital that he could afford to make the experiments which led to these improvements. The system of drainage was at first stoutly opposed by the farmers, but it was taken up by the Duke of Bedford and other intelligent landlords, and now it had spread all over the world. He remembered a county member addressing an agricultural audience, and sneering at artificial manures, saying there was nothing like "muck," which was received with loud applause. The weak point of the case was that, though our agricultural labourers might be well-off compared to those of other countries, they were not so proportionately to mechanics. The only way to achieve the desired result was for every one to do all in his power to spread education among the labouring classes, for although they had not the franchise, yet there was no doubt but that they soon would have it.

Sir GEORGE JENKINSON, Bart., who regretted he had not been in time to hear the paper, said that Mr. Hoskyns had admitted that large owners were the best employers of labour. He understood him to say that in the neighbourhood of large owners the labourers were well paid and cared for, and lived in good cottages, but that the reverse was the case where tenant farmers were occupiers; and what was the inference, but that where there was most capital there would be the best remuneration for labour. He thought the subject of labour was one very much misunderstood, and was fraught with great difficulty. It was said that education would make good labourers, and do away with all the evils now existing; he advocated education, and thought it must be given to the rising generation of labourers, in order to fit them for the duties which would inevitably, at no distant day, devolve upon them; but he did not believe education would enable a man to till the ground better than his fellow who had had no education An exemplification of this was to be found in the case of railway navvies. There were no men in the world who had so much physical ability to do an enormous amount of work; they laboured from Monday morning until Saturday afternoon, and, as a general rule, were drunk from Saturday afternoon to Monday morning. They received enormous wages, and consumed an enormous amount of beef and beer, and did far more work than any agricultural labourer; but what enabled them to do so was not education, but the amount of food which they consumed. In the same way, education would not enable the agricultural labourer to do more work. He was, however, not the less an advocate for education, which it was the duty of the upper classes to give to those below them, but he did not like the question put upon a false issue. This subject could not be too widely ventilated; and he hoped it would be taken up, not only by societies and chambers of agriculture, but by farmers' clubs. He might mention that he knew instances of hovels, not fit for human beings to live in, which were owned in freehold by the occupants, and which nobody could remove; and he did not think this was a feature sufficiently recognised by those who talked on this subject. He had lately seen in

the papers the detailed case of a man with a large family of ten children, the eldest of whom earned 3s. 6d. a week, and when the man was asked about sending the lad to school, he replied, that it was not the question of the penny for the schooling, but of the 3s. 6d. which he earned, and which made just the difference between living and starving. That was the great difficulty which had to be met in reference to education, and which, he thought, it was impossible to get over.

Mr. J. BENNETT said the subject was a most important and difficult one. They could improve the land and every animal on it except the most important animal of all—the human labourer. During the last forty years there had been some slight improvement in his personal cleanliness, but they failed to see much improvement in the most fundamental point—the dwelling. He had a farm in Sussex, on which he employed some seventy men, but he found it a growing difficulty to provide habitations for them, and some had to walk four miles to their work. He could not get a bit of land on the roadside on which to put up any cottages, and he did not know how to remedy the evil, which was a very grave one. Mr. Hoskyns had alluded to the land laws, but he thought the game laws had also something to do with the question. The great landowner attached much more importance to the game than to the condition of the labourer, and would not have a cottage in this place or that, lest the game should be interfered with. As to the state of education, he (Mr. Bennett) had offered a shilling to each of his men who could write their names, but not ten of the 70 could do so, and the question was, how this ignorance was to be overcome. In some places the parson would assist them, and in others he would not, or could not, and then the case was hopeless. Some of the clergy were afraid of the men becoming too independent, and thinking for themselves, and the squires thought education would make them saucy, and that if they learned anything beyond the limits of their own parish, they would draw comparisons, and that when improvement once began they would improve themselves off the land altogether, and go where they believed they would be better off.

The CHAIRMAN said he could not close the discussion without a remark or two on what had fallen from the various speakers; and he must specially notice the remarks made early in the evening respecting trades' unions, and the effect of the poor laws upon agricultural labourers. It appeared to him that the speaker (Mr. Read) was not sufficiently informed about trades' unions when he spoke of the system of day work having the same effect, which was enabling the men to do the least work and have the highest pay. The object of trades' unions was to bring men together to agree to a uniform rate of pay, which they thought most conducive to the welfare of all; and he could not agree that the effect of trades' unions was such as Mr. Read had stated it to be. Then the same gentleman went on to trace the effect of legislation in introducing foreign cattle, and drew the inference that that had been the cause of the increase in the price of meat, stating the price of meat so many years back; but he forgot that there was an intervening period when meat was quite as high as at present, long before the operation of Sir Robert Peel's Act—certainly long before the introduction of contagious diseases by foreign cattle. The fact was, that if the importation of foreign cattle had been injurious, they must not forget that long before the disease was introduced hundreds of thousands of foreign cattle had been imported, of which the country had had the benefit.

Mr. C. E. READ said he had not alluded to the cattle plague, but to pleuro-pneumonia and other diseases of a similar character.

The CHAIRMAN said that if the state of the case was as bad as Mr. Bennett seemed to think, it appeared almost hopeless, but if the labouring classes did, as he believed they would, gradually improve, there would be an increase of produce from the land, and the whole class would rise considerably in the social scale. Mr. Denton had endeavoured to show how they might be improved, but no one seemed to have noticed that which he (the Chairman) principally relied on, the appropriation of a certain number of hours to general education, and a certain number to practical instruction in farming pursuits, so that in a few years they would be in a position to earn the highest rate of wages in their calling. Then there was the question of the improvement of their dwellings, which had been taken up by this Society again and again, plans having been prepared, and every possible scheme suggested for reducing the cost, but they could not bring it within £130; they could build a hovel for a great deal less, but not a cottage fit for a labouring man to live in. If they had improved dwellings, and the other things which had been mentioned, gardens and friendly societies, and co-operative stores which might do a great deal in enabling them to supply themselves on the lowest terms, they would soon be in a much better position; and above all, if they could induce these men, not by legislation, but by showing them the benefit of it, to abstain from the beer shop, their greatest enemy would be conquered. They must not go away with the idea that the navvy was such a deplorable creature as the hon. baronet had painted him; they were not, as a rule (and he knew a great deal more of them than of agricultural labourers) drunken or unintelligent men; they were one of the most intelligent class of workmen in the country. Take a navvy abroad, and he was the most valuable man you could get; place him in circumstances of great difficulty, requiring coolness, intrepidity, and perseverance, and the behaviour of these men was most remarkable. The great works of the country could not have been accomplished but for the energy and discipline which existed amongst them. Most of them had attended national schools, and had a certain amount of real education, and it was this, combined with their practical knowledge, which made them such valuable workmen. There were drunken navvies, no doubt, and in this, as in other cases, people were apt to judge a class by a few. It was too common to attribute to the large proportion of the working classes the tendency to crimes which was exhibited by a few, in the same way as it was common in the present day to say that commercial morality was very low, simply because by the facilities for printing and discussion every instance of fraud was brought prominently before the public over and over again *ad nauseam*. He now begged to move a cordial vote of thanks to Mr. Denton for his very able and valuable paper, and, in doing so, he might be permitted to take the opportunity of thanking the Society on his own behalf for the very kind manner in which they had always received him as Chairman of the Council, in which capacity he now appeared for the last time as presiding at an evening meeting. He had held that office for four years, and during that time he had presided over many meetings, and had always been received with a kindness and courtesy which had led them to overlook those shortcomings of which he himself had been but too sensible. He could only hope that his conduct while Chairman of the Council had met with the approval of the Society.

The vote of thanks to Mr. Denton having been passed,

Mr. DENTON said he would only make one remark in reply. There could not be a better illustration of the value of the suggestion he had made as to technical, combined with primary education, than that which the hon. baronet had alleged with regard to the navvy. The drunken navvy was invariably a bad agricultural labourer. At the present moment he (Mr. Denton) had under him about 1,500 men of the same class as the navvy, and many of them had been agricultural labourers until by practical education they became fitted for draining work. The

drunken men were generally those who for want of practical education were unable to earn good wages. Those who had acquired that knowledge earned good wages and very seldom drank. There was no steadier or worthier man than a properly educated navvy.

The Reverend Canon Girdlestone writes:—"I desire to state my conviction that, notwithstanding many plausible statements to the contrary, made chiefly by interested parties, agricultural labourers in all parts of England—some more, some less, but all to a great extent—are in a far more depressed condition than any other class of workmen. It is proverbial, I believe, that there is no one, however liberal in opinions, who would seriously propose to trust the franchise to poor Hodge, as he is called, until he has, by some process or other, been made much more of a man than he is at present. I am inclined to think that the most likely instrumentality for his improvement consists of a system of registration, and removal from low-paid to better-paid districts, and the formation of mutual aid and protection societies, strictly guarded by rule against aggression and violence. If a central committee could be formed in London of those interested in the subject to promote and set on foot the above, and to push forward all such questions as that of education, improved dwellings, better administration of poor law, &c., &c., something practical might result. But I fear the class is at present too depressed to be in a condition, without extraneous aid, to keep themselves."

Mr. Mechi writes:—On the 11th December, 1851, I placed before your Society the labourers' balance-sheet, calculated for man and wife and three children. His wages were then 8s. per week, now they are 12s. per week; but as his nine 4-lb. loaves now cost 9d. instead of 5d. each, and as pork, butter, cheese, soap, and candles are now dearer than then, he is really only advantaged to the extent of about 7½d. to 9d. per week. He saves 1½d. per week in tea, but, as all his clothes and those of his family were of cotton, with a little woollen, he was sorely pinched during the cotton famine. His principal gain is in the more steady demand for his labour, caused by agricultural improvements. On other parts of his condition I have reported to my friend Mr. Denton, with whom I am sorry I cannot be present this evening."

Manufactures.

The Cotton Industry in Italy.—The cotton plant is extensively cultivated in the plains of Salerno, near Naples, and Calabria, also in the valleys of the islands of Sardinia and Sicily. The production of cotton during the last few years may be estimated at 60 millions of francs. This industry, if more developed, would become an immense resource for agriculture, especially in the Southern provinces and Sardinia, where there are immense tracts of land which might be reclaimed. The following are the imports and exports of raw cotton:—

Imports.

	Quintals.	Francs.
1863	40,562	7,545,000
1864	31,543	5,867,000
1865	28,425	5,287,000
Average	33,510	6,233,000

Exports.

	Quintals.	Francs.
1863	16,135	3,001,000
1864	29,250	5,441,000
1865	44,974	8,365,000
Average	30,120	5,602,000

The total number of cotton mills in Italy is 200, with 1,000 machines, and 450,000 spindles, employing 10,000 work-people. Upwards of 143,767 quintals of cotton are spun annually. The following is the annual amount of capital employed in this manufacture:—

	Francs.
Value of raw cotton to be spun	17,400,000
Interest on the capital employed for the machines and buildings, the wear and tear and repairs	3,000,000
Wages to work-people, interest on the capital in circulation, and profits	14,500,000
Value of the cotton spun	34,900,000

This industry is in a comparatively flourishing state in Italy, for the low price of labour and the abundance of water power. The following is the trade in cotton yarn in Italy:—

Imports.

	Quintals.	Francs.
1863	44,310	19,222,000
1864	36,672	16,364,000
1865	69,076	30,831,000
Average	50,019	22,136,000

Exports.

	Quintals.	Francs.
1863	1,328	666,000
1864	1,063	471,000
1865	397	217,000
Average	929	451,000

The capital employed in cotton weaving is as follows:—

	Francs.
Value of 32 million kilogrammes of cotton spun	33,800,000
Wages of the warpers and weavers	30,700,000
Bleaching, dying, interest on capital, profits, &c.,	15,500,000
Value of cotton stuffs	80,000,000

The number of looms employed for cotton weaving in Italy are 86,000,000, which are scattered all over the country. The number of weavers may be estimated at 100,000. The following are the exports and imports of cotton goods:—

Imports.

	Quintals.	Francs.
1863	65,406	56,686,000
1864	60,998	51,289,000
1865	81,807	65,851,000
Average	69,404	57,942,000

Exports.

	Quintals.	Francs.
1863	1,000	843,000
1864	700	665,000
1865	468	580,000
Average	723	696,000

Commerce.

The Cotton Trade.—Messrs. G. and J. A. Nobles' *Circular*, dated May 7th, says:—"The satisfactory state of commercial affairs has continued, and, in fact, increased dring the month of April, and the fatal impressions of the two previous disastrous years seem to have been altogether dismissed from the public mind. We look for further progress in the general prosperity, inasmuch as the deliveries of cotton to the trade are larger than ever, and, so far, fifty per cent. more than last year, though speculation has nearly doubled prices

since January, but stocks, notwithstanding some increase in the importation, are very low, barely more than half of this time last year, and seem to justify the great advance in the value of this staple of our chief manufactures. Deliveries of other commodities are also large; the railway status shows a constant increase, and the season is so unusually fine, that excellent crops may be looked for almost with certainty. For these reasons we make no doubt that large shipments of those commodities to which we devote our attention may be recommended, and that whatever is sent will, as the year advances, meet with improving markets."

EMIGRATION FROM ITALY TO SOUTH AMERICA.—During the month of March 12 ships, with 1,066 emigrants, sailed from Genoa. Of this number 267 were natives of Genoa; 150 of Sondrio; 118 of Como; 96 of Milan; 59 of Potenza; 45 of Cuneo; 44 of Turin; 36 of Alessandria; 29 of Salerno; and 27 of Pavia.

THE PRODUCTION OF OIL IN ITALY.—One of the most important products in Italy is olive oil. The average annual production is upwards of 1,500,000 hectolitres (33,000,000 gallons), representing the value of about 200,000,000 frs. (£8,000,000 sterling). A large amount is consumed in the country, and the exports do not exceed 70,000,000 frs. (£2,800,000). The following is the production in each province:—

	Quantity. Hectos.		Value. Frs.
Neapolitan provinces	629,597	..	80,600,000
Sicily	307,380	..	39,350,000
Piedmont and Liguria ..	283,500	..	36,300,000
Tuscany	160,000	..	20,480,000
The Marches	57,300	..	7,350,000
Island of Sardinia	54,000	..	6,900,000
Lombardy	48,315	..	6,180,000
Emilia	9,400	..	1,200,000
Umbria	2,880	..	370,000
Total	1,552,372	..	198,730,000

The exports of olive oil are principally to France, England, Austria, Russia, and to America. About 10,000,000 francs worth of mineral oil is imported to Italy, but in exchange Italy exports to the value of 12,000,000 francs in linseed, nut, rape, sesame, castor, and sweet almond oil.

AGRICULTURE IN HUNGARY.—There is no country which has made such progress during the last few years as Hungary, the population of which has, in twenty years, doubled itself. In 1850 there were 7,864,262 inhabitants, and at the present time the population is not less than 15,000,000. Hungary, from its position and natural advantages, might become one of the richest countries in the world. Up to the commencement of the present century it was only half civilized. In 1852 there were about 10,000 square miles of pasture land in Hungary; at the present time four-fifths of this is under cultivation. The area of Hungary is about 35 millions of hectares of land (86,450,000 acres), of which 6 millions are yet unproductive, and 29 millions of hectares are under cultivation. Of this there are 8,679,273 hectares of woods and forests; 9,751,412 hectares of corn; 4,166,383 meadows and gardens; 5,952,268 hectares of vineyards; and although, on account of climate, the vine can only be cultivated in certain positions, the Hungarian wines, such as Tokay, are well known, and 310 hectolitres of wine from this country were exported in 1864. Hungary is above all a rich pastoral country. With 15,000,000 of inhabitants there are 11,200,000 sheep, and there are 150 horses to every thousand inhabitants. In no other country is there, comparatively, such a large quantity of horses, as on every 1,000 inhabitants in Ireland, there are but 107 horses; 98 in Prussia; 80 in France; and 61 in Belgium. Hungary is also, as compared with other countries, the richest in horned cattle, numbering 410 head for every 1,000 inhabitants, whilst France only numbers 282; Belgium, 278 head; Prussia, 305 head; and Holland, 387. As regards sheep, the proportion is lower than in France and Prussia, the former having 930 for every 1,000 inhabitants, and the latter 943, whilst in Hungary there are 819 to every 1,000 persons; 439 in Bavaria; Holland 260; and 129 in Belgium. Of pigs Hungary possesses, compared with the number of inhabitants, three times the number of Belgium, and double that of France, being 327 for every 1,000 persons; whilst in Holland there are only 81; in Belgium 101; in France 147; and in Prussia 146 for every 1,000 inhabitants. In 1866 there were 2,855,755 landed proprietors in Hungary, or about 1 proprietor out of every 5 inhabitants. Hungary, in many places, suffers considerably from great droughts, and, on the average, every fourth year there is a great dearth on account of the dryness of the season; and in many parts of the country there is only 13 inches of rainfall in the whole year. If irrigation were carried on in this country to the same extent as in Lombardy, and the natural watercourses were made to supply canals for irrigation, Hungary would become one of the richest agricultural countries in Europe. For this purpose a company has been proposed to be formed, with a capital of £4,000,000 sterling, for irrigation. In 1867 the average production of grain in Hungary was 35 hectolitres per hectare (39 bushels per acre), and the quantity produced in that year was 44,000,000 of hectolitres (or 15,131,644 quarters) of grain, of which 28 millions of hectolitres were consumed in the country, and 16 millions of hectolitres were exported, of the value of 300 millions of francs.

Colonies.

IMPORTS AND EXPORTS OF VICTORIA.—From the official statement of the Department of Trade and Customs it seems that the imports into the colony of Victoria during the year 1867 amounted to £11,674,080, and the exports to £12,724,427, the exports exceeding the imports by £1,050,347. On only one occasion during the last eleven years have the exports exceeded the imports; this was in 1861, when the excess was £286,154. The cattle, horses, and sheep are valued at £579,314. The imports were £3,880,047 less in the third year of the new tariff than in 1864—the last year of free trade, and £3,676,945 less than in 1866. The principal decrease in the imports is in the importation of grain and flour, which amounts to £995,749. Making allowance for this, there is still the fact that the imports of 1867 fall short of those of 1866 by £2,784,407, and of those of 1864—the last year of the old tariff—by £2,884,298.

TASMANIA.—There are 3,403,010 acres of alienated land in the colony of Tasmania. The area is 15,571,500 acres, including dependent islands in Bass Straits, thus leaving 13,374,990 acres of unalienated land. The population is very small in comparison with the territory, being only 98,454 on 31 acres in 1867, or an increase of only 14,034 in ten years.

OPIUM IN VICTORIA.—A successful attempt at growing opium has been made in this colony. A few plants have been raised this year, and the produce has been pronounced by good judges to be of first-rate quality. The Chinese horticulturists in these districts will no doubt avail themselves of this experience, and it is expected that opium crops will be largely cultivated.

PLANTS CULTIVATED IN QUEENSLAND.—In the Botanic Gardens of Brisbane is to be seen the jute of India, and other fibre-producing plants, growing in the greatest luxuriance, although the land there is not richer than in other parts. Indigo of first-class quality, and with a heavy yield per acre, has, within a short period, been produced from several plants growing in the same garden. The coffee plants there have for years yielded good crops, and a Chinaman, not long since, manufactured tea from the tea plants growing in the same spot. These are only a few of the many products which can be cultivated in different parts of the colony. That

they can be satisfactorily produced to yield a profit has not yet been proved, but the chances are, at any rate, greatly in their favour.

SHEEP WASHING.—An Otago paper says:—"The new process of sheep washing by means of hot water, followed by the sheep being brought immediately under a strong spout of cold water from a considerable elevation, has been successfully carried out this season at the Deep Well station. The samples of the wool have been examined, and the tips are entirely free from dirt, and the whole fibres very pure and clean, with a fine, soft feeling, rendering it well adapted for immediate use by the manufacturer."

Notes.

ARCHÆOLOGICAL DISCOVERIES AT ROME.—The excavations now being made, by the munificence of the Pope, are proceeding with most interesting historical results, and bringing to light a large number of the ancient master-pieces of art, with which the Holy City was once embellished. Two flights of steps, which led from the river, have been cleared, and two passages have been discovered which give direct access to the interior of the adjoining market. At the depôt of marbles, on the banks of the Tiber, was found a large staircase, with sculptured ornaments, in a position exactly corresponding with the anticipations of the learned director of the works. Up to the present time there have been found 111 blocks of African marble, 240 of antique yellow, and as many of serpentine. Other varieties are met with in smaller quantities, as antique red, and green, breccio, and even chalcedony. At Ostia, where the researches are being made by a commission of antiquaries, some remarkable monuments have been found, throwing a new light on the worship of Cybele in that place; amongst other things there is a series of votive offerings on the ground consecrated to that goddess. In the same place were discovered the remains of a temple, designed for initiatory ceremonies, and which forms an edifice quite unique of its kind; also a house very elegantly decorated, on the walls of which was a fresco, representing a festival sacred to Diana. This painting is of extreme delicacy of execution.

POPULATION OF EGYPT.—According to the census taken last year, the inhabitants of Egypt are 4,911,619. Amongst these are half a million of Copts, descendants of the ancient inhabitants of the country; 400,000 Bedouins; 250,000 Europeans and Syrians; and 500,000 Turks. In Alexandria, at the close of the last century, scarcely 40,000 inhabitants were counted, whereas, at the present time, that city contains 200,000, about half of whom are Arabs and the other half Europeans. The nationality of the latter is ascertained to be as follows:—Greeks, 25,000; Italians, 18,000; French, 16,000; Anglo-Maltese, 13,000; Syrians and natives of the Levant, 12,000; Germans and Swiss, 10,000; people of various other nations, 6,000. Cairo, the capital, contains upwards of 400,000 inhabitants. Within its walls are 140 schools, more than 400 mosques, 1,166 cafés, 65 public baths, and 11 bazaars. The other towns of importance, as regards their population, are—in Lower Egypt, Dalmietta, 45,000; Rosetta, 20,000; and in Upper Egypt, Syont, on the left bank of the Nile, numbering 20,000 souls. The amount of commerce with France was, in 1866, as much as 80,665,172frs. of imports, and 83,810,114frs. of exports.

Correspondence.

LIQUID FUEL.—SIR,—I am exceedingly sorry I was not able to attend the meeting at your rooms when the paper on liquid fuel was read by Mr. Paul, that I might have answered the extraordinary statements respecting my process, lately so successfully carried on at Woolwich Dockyard. I must inform you that neither Mr. Paul nor Captain Selwyn have seen my boiler in operation. How, therefore, while admitting that an evaporation of water was obtained, corroborated officially, greater than has ever been effected, and that with little smoke—almost a perfect combustion, in fact—they could announce that my process was the most wasteful, and the one least likely to yield good results, I cannot understand. Will you permit me to make a few observations on the subject? The statement of the American commissioner that the oil or petroleum was beyond a doubt more than twice as effective as anthracite coal in the production of steam, was correct. Mr. Paul knows that the best coal must do good service if an evaporation is obtained of 7 lbs. of water to 1 lb. of coal. The official report stated I had 18·31. Mr. Paul will not allow, like nearly every other chemist, that water vapour can be used advantageously or with any benefit as fuel. Whatever may be the incomprehensible law as to the use of water as fuel, it is quite certain that great advantage is gained by introducing water vapour into a furnace, so that it can be decomposed by the incandescent fuel. Mr. Siemens makes careful provision for water being part of the fuel supplied to the regenerative furnaces. In my first experiments at Woolwich, in 1864 and 1865, when petroleum was burnt alone, an evaporation of only 12½ was obtained, with smoke and soot in great quantity. On the introduction of water vapour the evaporation rose to 18·31; and in February, 1867, creosote only being used, to 18·91, without or with very little smoke or soot. The official report as to the 18·91—or nearly 19—was made after the one published by order of the House of Commons. There is more difficulty in getting the last pound than there is in getting the first eighteen. If I could have gone on longer on that occasion I might have reached a higher figure, because the boiler always evaporated slowly the first few hours. I had come to the end of my creosote, and I cannot bear the fatigue of a longer attendance than eight or ten hours. My own opinion as to the value of water vapour rests upon my constantly viewing its operation in the furnace. It is this that, although it may be of no use alone, it is of great use when used in conjunction with any other fuel—more particularly liquid fuel, to which it seems to have an affinity. It brings out nearly the full theoretical value of that fuel, allowing no deposition of unconsumed carbon to take place. Or, to describe the operation more in detail, the water gases, when separated, do not again unite; the hydrogen, being very volatile, escapes upwards to burn with the other hydrogen in the furnace, both getting their oxygen from the air let into the fire-place. The oxygen of the water gas, being very heavy, remains behind, and busies itself with the escaping carbon of the other fuel, so that the fuel is completely burned. On my turning on the tap admitting the steam all the coating of soot resting on the grate rose up and disappeared; it was consumed. On looking into the tubes, the soot was seen floating in the gas; and being treated in the same way, the fire suddenly brightened, became intense, and without smoke. With American petroleum the effect was beautiful; the instant the steam was turned on, every tube in the boiler was illuminated with light thin flame; with shale oil and creosote the effect was not so great, but the flame where the tubes were filled was much stronger. Of course, success depends upon carrying out the process most carefully; all parts of the apparatus must be properly contrived and properly constructed. These are the words of Professor W. J. Macquorn Rankine, F.R.S., who, of all the chemists, alone appears to back my opinion. He has stated that "the oxygen of the steam combines with the carbon of the hydro-carbon fuel, and the hydrogen of both is set free; there is a mixture thus produced of carbonic oxide and hydrogen, which is sure to be completely burnt as soon as a sufficient quantity of air gets

access to it, and thus the deposit of unconsumed carbon is entirely prevented." By my method of using the steam it is economised. I prefer common steam to discharge into the grate; the operation of super-heating, decomposing, and taking up the carbon is instantaneous and continuous. In my first operation with the common service boiler I did not obtain a proper construction. It had been tried two days with the best hand-picked Welsh coal. This was equalled with oil my first day, but not the second. I only evaporated both days 32,096 lbs. of water, with 2,607 lbs. of oil, against the coal that did the same with 4,260 lbs.; but on the second day's coal trial 39,648 lbs. of water was evaporated with 6,000 lbs. of coal. This I did not arrive at, but the two coal fireplaces were perfect in their make. I could only use one of them with oil my last day, the other being imperfectly constructed. It can hardly be said I was defeated. The operations were not continued, because I was required to be at the expense of the alterations necessary. I considered that, after the amount of success I had obtained, this should not have been put upon me. I was unable to bear it. Advantage has been taken of this by other patentees, to state that my process has altogether failed, which is untrue. It is but fair that they should obtain a result equal to mine before they come forward to put aside my system. Already one of my greatest opponents has had his apparatus tried at the dockyard, without its being considered worth reporting upon at all. Captain Selwyn stated that it was true my process gave an enormous deposit of carbon, and that this was because I did not know how to apportion the air to the supply. In 1846, not having seen my process in action, he sent me down a drawing, showing me how to supply the air. It was something after the American plan, mixing air in the vapour chamber. With the consent of Mr. Trickett, I had the pipes he proposed put in, and I had, in consequence, an explosion every five minutes, first from one pipe, and then from one of the others; there was no harm done, but the mild, pistol-like explosions were annoying, and the pipes were closed up. It is true, that in my last trial, with an oil I had never used before, there was left in the grate a large amount of a friable ash, full eight or ten inches thick; it was hard, and like a very open pumice stone. At that time both the engineers of the yard, as well as myself, considered all these liquid fuels to be petroleums. I had seen the same kind of ash at the works of the Trinidad Petrolem Company, when the manager, experimenting with the oil as fuel, shut up the furnace, not allowing any air to get in at all; he considered the oxygen of the decomposed steam to be alone necessary. On opening the furnace after, as he stated, it had worked admirably, a large amount of this ash was found. On its appearing in my boiler, I considered I had not allowed sufficient air; but on my showing it to a chemist, he assured me that no amount of air or heat would have destroyed it. If Etna cannot destroy her pumice stone, a simple boiler might be unable to do the same. The ash crushed made, the Trinidad manager told me, a very good imitation emery powder. My former boiler had worked for several months without this peculiar ash appearing; the ash it did make was serviceable. It proved that all these liquids were not proper for fuel; that those prepared from bitumen might be found useless. Now, as to creosote, Mr. Paul estimates the quantity made here as 100,000 tons; Captain Selwyn at about three times that quantity. I believe Mr. Paul is about right; but, whatever is the quantity, it is of two kinds, the town creosote and the country creosote, each in about equal quantities. It is only the country creosote that can be conveniently used for fuel. The other is filled with naphthaline salts, which get into and clog the pipes. When Mr. Crow was experimenting with my boiler, he was perpetually washing the pipes with naphtha, and setting it on fire, in order to warm them so that the oil should flow through. Naphthaline is still more difficult to use; I doubt whether a steam-pipe in a tank of this stuff would melt it, and the pipes provided for it to flow through must be almost at a red heat. Captain Selwyn is to make 23 with it; he has a good boiler, and I trust he may succeed. Mr. Young stated that the number of gallons of oil that could be obtained from coal, averaged from 50 to 60 gallons per ton; and that it would be better to distil the coal for the sake of the oil, than use it in its raw state. Now, permit me to inform him that the best Newcastle coal yields so small an amount of oil—hardly two or three gallons per ton—that it is not worth extracting. It is the mineral shale, and that, the furthest removed from coal, that gives the most oil. Some rich specimens yield from 80 to 90 gallons per ton, but the average yield of all the shales is from 30 to 40; at present only the best are used, the oil being wanted by distillers; but when it comes into use as fuel, the common or poorer shales will be used, and shale lands will get up enormously in value. There are other minerals, at present almost unknown, which are richer in oil than the shales; these are the Albertites, the Cannelites, and the like, distributed all over the world, and, like the shales, in immense quantities. I regret to say that most of the visitors at Woolwich to view my process attended with the intention of taking out patents themselves. Some of the latter are clear copies of mine, made without even understanding its principle. My process makes a fiery spray of the oil, a porous material being used with jets of steam. Messrs. Aydon's process does the same. I spread my jets of steam under the porous block; they group them together, and jet them on the top. The only difference between the two systems is, that their process does on a small scale what mine can do on a large one. I could lengthen this, but I fear I should require too much of your valuable space.—I am &c., C. J. RICHARDSON.

21, Carlisle-terrace, Kensington, W., May, 1868.

FUNGI AS FOOD.—SIR,—In Mr. Berkeley's interesting evidence on fungi as articles of food, given before the Food Committee, and reported in the *Journal* of May 15th, justice is, I think, not done to *Coprinus* (misprinted "Copirnus") *atramentarius*, which, with its beautiful relative, *C. comatus* (not mentioned at all), both he and Dr. Badham seem to consider only of rather doubtful merit in the manufacture of ketchup. Both these species I have often eaten, and have no hesitation in pronouncing them, if cooked before the dark spores appear, among the most delicate of the tribe, and, I believe, perfectly wholesome. The late Dr. Whewell was here when they were in season, and preferred them much to the *Agaricus campestris*. The dark liquid, resulting from the ripening of the spores, may be used as a fine dark-brown pigment in oil and water-colour painting.—I am, &c., W. C. TREVELYAN.

Wallington, Newcastle-on-Tyne, 17th May, 1868.

P.S.—I have no doubt that perfect mastication with bread, which Mr. Berkeley speaks of, will render, not only fungi, but many other species which are sometimes considered poisonous, digestible and perfectly wholesome, and that many cases of apparent poisoning, especially amongst children, result from indigestion, caused by substances, especially small fruits or nuts, being bolted whole, without having undergone the necessary process of crushing or mastication.

DRIED MEAT.—SIR,—Dr. Hassall's attention has been called to the evidence of Mr. Orr, reported in your *Journal* of the 15th inst., in reference to dried meat in powder from Australia. I beg to inform you that the importation and sale of such an article in this country (without the sanction of Dr. Hassall) would be an infringement of the patent obtained by him for the preparation of flour of meat. The publication of this notice in your next number will oblige.—I am, &c., HENRY SIBLEY.

3, Lincoln's-inn-fields, May 18, 1868.

GAS LIGHTING.—SIR,—In your report of my remarks on controlling gas lamps by clockwork, I am reported

to say that Mr. Denison approved of the scheme as applicable to public lamps. I limited my remarks as to Mr. Denison's approval to the automatic lighting of public clocks.—I am, &c., JOHN JONES.
338, Strand, W.C., May 15.

MEETINGS FOR THE ENSUING WEEK.

MON.....R. Geographical, 1. Annual Meeting.
Victoria Inst., 4. Annual Meeting.
Social Science Assoc., 8. Mr. John Noble, "Suggestions for a Revision of Taxation."
R. United Service Inst. Mr. John Elder, "Circular Ships of War with immersed Motive Power."
TUES ...R. Medical and Chirurgical, 8½.
Civil Engineers, 8.
Ethnological, 4. Annual Meeting.
Royal Inst., 3. Dr. M. Foster, "On the Development of Animals."
WED ...Archæological Assoc., 8½.
THUR ...Royal, 8½.
Antiquaries, 8½.
Royal Inst., 3. Prof. Grant, "On Astronomy."
Zoological, 8½.
Philosophical Club, 6.
Mathematical, 8.
Society of Fine Arts, 8. Exhibition of Photographs of the Palestine Exploration Fund.
FRI.....Royal Inst., 8. Mr. W. E. H. Lecky, "On the Influence of the Imagination upon History."
SAT .....Royal Inst., 3. Prof. Grant, "On Astronomy."

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Par. Numb.

Delivered on 8th May, 1868.

103. Bill—Poor Law (Ireland) Amendment.
104. ,, Stockbrokers (Ireland).
219. Abyssinian Expedition—Estimate.
243. Exchequer Bonds—Account.
Manufactures, Commerce, &c.—Reports by Her Majesty's Secretaries of Embassy and Legation (No. 2, 1868).

Delivered on 13th May, 1868.

114. (I.) Parishes—Return.
211. Electric Light—Further Correspondence.
Births, Deaths, and Marriages—Twenty-ninth Annual Report.
Trades Unions and other Associations—Sixth Report of the Commissioners.
Ritual Commission—Second Report of the Commissioners.
Public Petitions—Nineteenth Report.

Delivered on 14th May, 1868.

112. Bill—Exchequer Bonds (£1,600,000).
259. New Courts of Justice—Estimate.
260. Abyssinian Expedition (Vote of Credit)—Estimate.

Delivered on 15th May, 1868.

109. Bill—Weights and Measures (Scotland).
113. ,, Promissory Oaths.
114. ,, Indian Railway Companies—Lords Amendments.
248. National Portrait Gallery—Eleventh Report.
255. Registry of Deeds (Dublin)—Returns.
Charity Commission—Fifteenth Report.

Patents.

From Commissioners of Patents' Journal, May 15.

GRANTS OF PROVISIONAL PROTECTION.

Aërial locomotion, apparatus for effecting—1005—M. P. W. Boulton and J. Imray.
Bale ties—1346—D. C. Lowber.
Billiards, &c., apparatus for marking at—1349—J. Wetherilt.
Boilers—1381—L. Perkins.
Boilers and furnaces—1371—J. Hepworth and G. W. Bayldon.
Boots, button—1313—T. L. Scowen.
Buildings, concrete, constructing—1364—C. Drake.
Cabs, &c., indicating the distances travelled by—1342—T. T. Macneill.
Carpets, &c.—1385—G. A. Cox.
Cartridges—1352—W. Bartram.
Cartridges—1353—W. Bartram.
Chlorine—1403—H. Deacon.
Coal, &c., getting and hewing—1220—R. Ridley and J. Rothery.
Concrete, impervious—1382—E. McDonnell.
Dress and jewellery fastenings—1350—W. H. Ryland.
Engines, jacquard—1383—J. and M. Pearson.
Fabrics, mixed, treating—1010—A. B. Wollaston and F. Stanbridge.
Fibrous materials, machinery for spinning—1420—W. R. Lake.
Fire-arms, breech-loading—1376—K. V. Barnekov.
Fire-arms, repeating—1344—J. R. Johnson.
Fire-irons, supports for—1368—T. Pemberton and T. Hughes.
Furnaces, blast—1410—W. Ferrie.
Gas engines—1393—G. B. Babacci.
Gas, purifying—1361—P. Spence.
Gas, &c.—1369—F. C. Hills.
Gelatine, manufacturing—1422—J. H. Johnson.
Glass rings employed in spinning, &c.—1246—E. A. Morgan.
Glue, preparing and refining—1388—A. Dietz.
Grain and seeds, securing and hulling—1004—R. Smith, jun.
Grain, &c., screening—1389—H. Waugh.
Hair seating—1384—G. T. Bousfield.
Hats, &c.—960—I. S. Lister.
Life and property, preservation of, at sea—1354—G. A. Welch.
Locks—1372—S. Tidmarsh.
Looms, healds of—1360—J. and R. Holding.
Manure—1351—J. Dewar.
Matches, &c., machinery for manufacturing—1401—J. J. Long.
Meat, &c., preserving—1405—J. H. Johnson.
Metal plates, ornamenting—1367—J. Atkins.
Meters, valves, and cocks—701—H. Wilson.
Millstones, dressing—1404—R. Scott.
Motive-power apparatus—1391—E. A. Rippingille.
Nails, cut, machinery for manufacturing—1406—R. Heathfield.
Ordnance, checking the recoil of—1357—W. N. Hutchinson.
Ores and minerals, preparing and dressing—1355—J. Bernard.
Paper binders or eyelets—1145—C. E. Turnbull.
Powder, blasting—1375—P. Nisser.
Pumps, steam—1046—S. Holman.
Railway carriages, &c.—1244—C. Burn.
Railway rolling stock—1377—H. Chaytor.
Railway signals, &c—1356—T. F. Cashin.
Reaping machines—1386—A. Jack, jun.
Screw blanks—1399—C. D. Fox.
Sewing machines—1390—W. Whitworth.
Shackles, &c., iron or steel—1407—A. Homfray.
Shawls, fringe on—1359—J. Craven.
Ships' bottoms, &c., preventing the fouling of—1395—J. Gray.
Ships' bottoms, &c., sheathing—1390—J. Scoffern.
Ships, iron, sheathing—1414—J. H. Cassell.
Steam, apparatus for condensing—1216—A. Barclay.
Steam generators and furnaces—1365—A. M. Clark.
Tapes, &c., retaining the outer ends of—1358—G. Marson.
Telegraphs, electric—1002—J. Lent.
Telegraphy—1370—E. P. H. Vaughan.
Telescopes—889—F. H. and C. A. Elliott.
Umbrellas and parasols—1392—J. Bottomley.
Valves—1362—A. W. Pocock.
Varnishes—1366—A. Parkes.
Wheels, wrought metal—1379—L. Perkins.
Wood, seasoning, &c.—1363—R. Cocker.
Yarns and textile fabrics, preparing materials for sizing—1402—J. McKean and J. Stenhouse.

INVENTIONS WITH COMPLETE SPECIFICATIONS FILED.

Albumen, manufacturing—1485—A. C. Henderson.
Books, machine for sewing—1539—A. Holbrook, jun.
Nail machines—1538—J. B. Kingham.

PATENTS SEALED.

3255. R. W. Pearse.	3282. W. H. Richardson.
3257. J. M. Napier.	3290. W. Brewster.
3265. E. T. Hughes.	3323. W. Mort.
3266. W., J., and J. Busfield.	3378. J. M. Napier.
3270. G. Pitt.	3428. R. Porter.
3272. T. Wood.	299. R. J. Moser.
3279. A. Barclay.	332. J. Thompson.

From Commissioners of Patents' Journal, May 19.

PATENTS SEALED.

3281. C. Mole.	3318. P. Salmon.
3284. H. H. Lloyd.	3320. W. Macnab.
3286. J. Oppenheimer.	3332. R. Ward.
3287. H. Greene.	3342. C. E. Penny.
3288. C. de Lavenant.	3343. J. A. Hopkinson and J. Hopkinson, jun.
3291. L. B. Joseph.	3348. C. T. Higginbotham.
3293. W. R. Lake.	3357. A. M. Clark.
3295. J. Townsend.	3379. E. Wood.
3299. W. R. Green & J. G. Freeman.	3380. J. R. Pratt.
3300. W. Blundell.	3392. W. C. Houghton.
3311. A. Munro.	3396. A. M. Clark.
3312. G. Welch.	3402. W. Starkey.
3314. G. D. Hughes.	3489. W. Clissold.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

1322. W. Chubb and S. Fry.	1357. R. Leddicoat.
1449. G. Elliot and R. P. Clark.	1371. W. Manwaring.
1665 W. Clark.	1392. W. E. Newton.
1341. W. Deakin & J.B.Johnson.	1387. A. V. Newton.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

1226. G. S. Goodall.	1261. A. Allan.
1356. W. Bywater.	1275. J. Hughes.
1225. J. and J. Bullough.	1295. T. Aveling and H. Rawlinson.
1253. D. K. Clark.	